Rubber Journal and International Plastics

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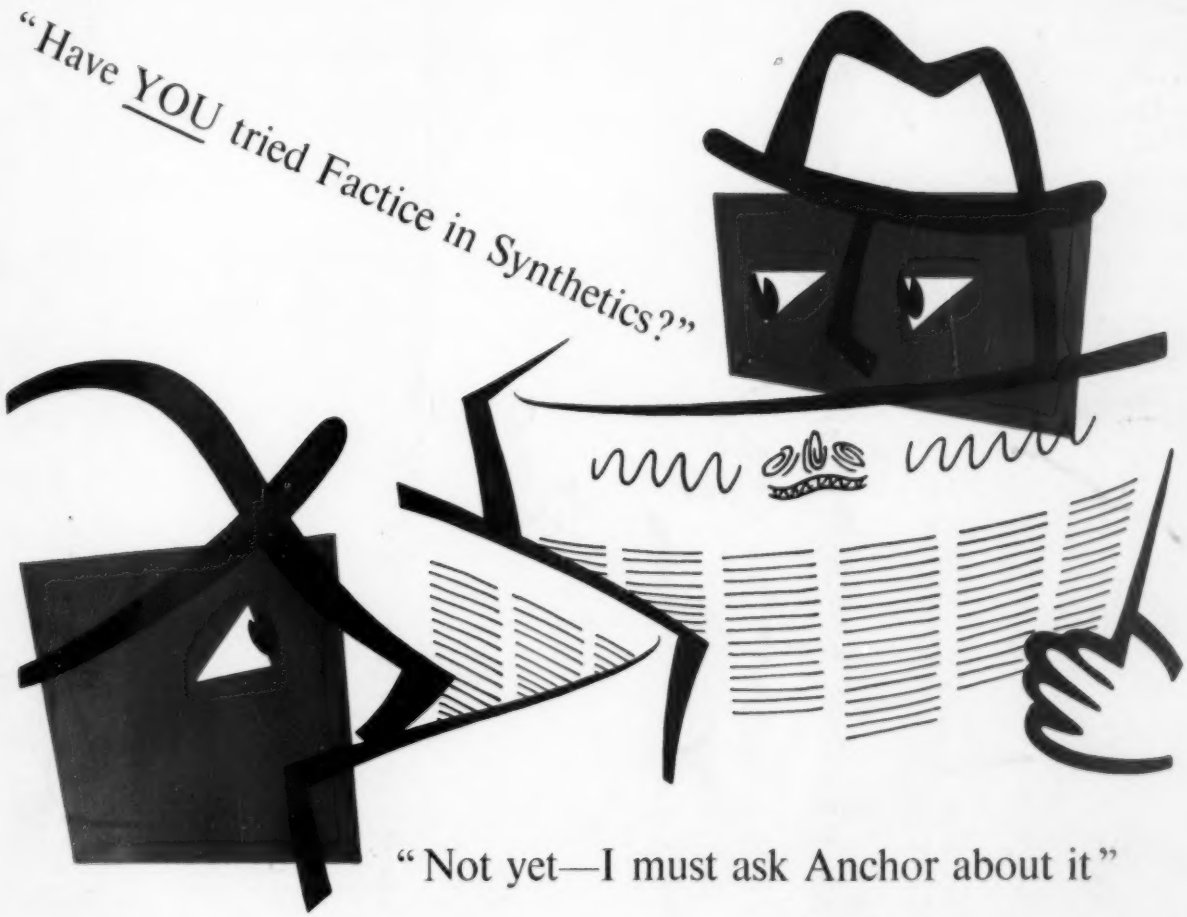

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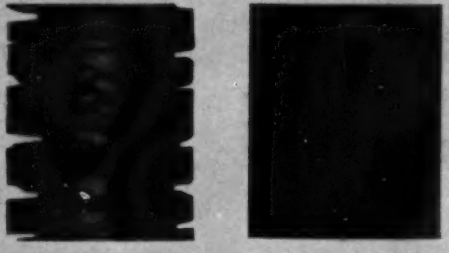

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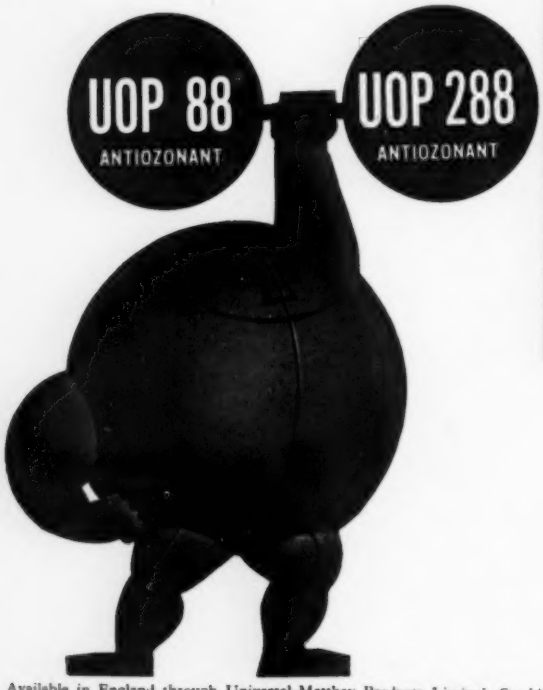

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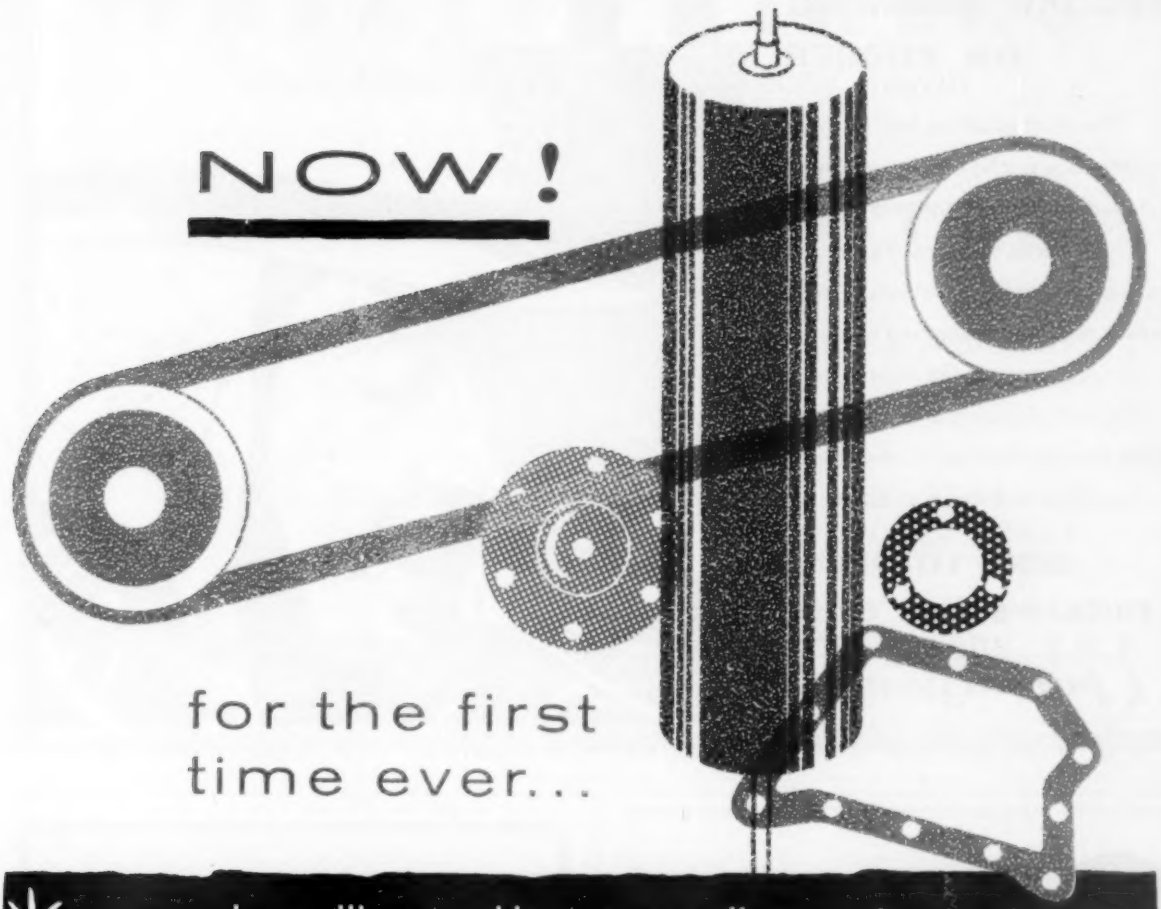

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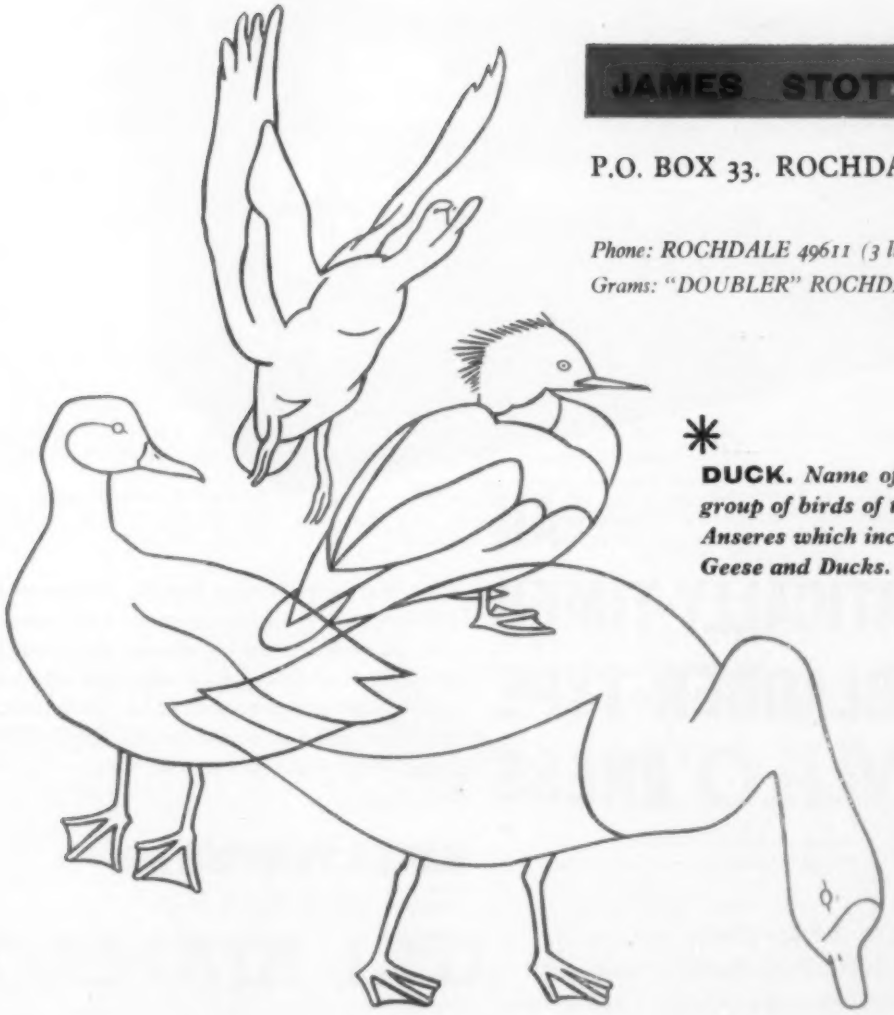

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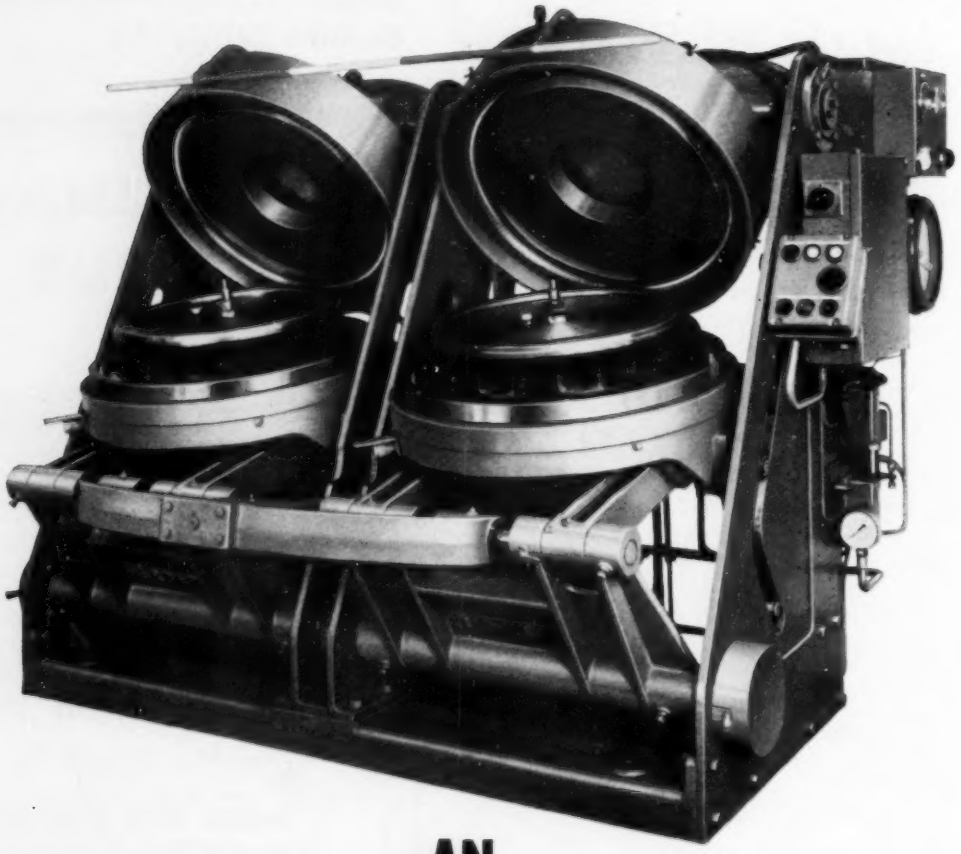

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IN ITS 77th YEAR

October 1 1960

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NOTES of the WEEK

Rubber Conferences

NOW assembled in Kuala Lumpur are many of the world's leading figures in the field of natural rubber. Three consecutive conferences, the first last week in Singapore—the International Rubber Packing and Quality Conference—the 15th meeting of the International Rubber Study Group and the Natural Rubber Research Conference, which started last Monday, have brought them to Malaya. Opening the International Rubber Study Group meeting on September 19, the Prime Minister, Tunku Abdul Rahman, emphasised that the Federation depended substantially on the earnings of her primary export commodities to finance development programmes.

'How important the problem is for a country like the Federation can be seen from the fact that nearly 65% of the total cultivated area in the country is planted with rubber, 60% of our foreign exchange earnings comes from our exports of natural rubber and a third of the Government's revenue is derived from the export duty on rubber and direct taxes on the profits of the rubber industry. For this reason, the achievement of a reasonable degree of stability in the production, trade and price of natural rubber is of utmost concern to us.'

The Prime Minister went on to say, 'As far as the rubber industry is concerned we have every confidence in the future of natural rubber. For this reason we have as early as 1953 embarked on a gigantic replanting programme to ensure that there will be an adequate supply of natural rubber at prices competitive with that of synthetic rubber. From 1946 up to the end of last year we have replaced 1.2 million acres of old rubber (which is a third of our total acreage) with modern high-yielding material which will yield three to four times the present output. Such a colossal programme cannot but be motivated by a sense of optimism and a feeling of confidence in the future of the natural rubber industry.'

Restrictions

THE moans from industry about Government restrictions in the home market tend to increase rather than grow less. Perhaps 'moan' is the wrong word because in its normal connotation there is an underlying implication that no real reason exists for giving forth. It is always 'Don't moan!' Or the implication may be that things can always get worse, and in this particular instance one certainly hopes they will not. In some industries opinion is pessimistic. Sir Patrick Hennessy, chairman of Ford, said the other day that the position in the motor industry would get worse rather than better unless the Government altered its restrictive policy. At about the same time a spokesman for Standard-Triumph International said, 'The continued imposition of restrictions in the home market which we should count on to help absorb fluctuations in world demand, is bound to prolong our difficulties and may well make them worse.' He was commenting on the dismissal of some workers and the institution of two-and-a-half and three-day weeks for others. The motor industry means rubber —more than 120lb. of it in an average small car—and, increasingly, plastics.

Incentives

THE day after these remarks were made, came a call from a company with direct plastics interests for Government encouragement or incentive for exporters. Mr G. E. Liardet, chairman of Simms Motor Units, one of the group of companies which includes Clearex Products Ltd. and Lester Plastics Ltd., said 'surely the people who go out to export, and to earn the foreign currency which the country must have, are entitled to some encouragement or some incentive. Why cannot we have some relief of income tax in ratio to our direct export sales. It may be said that this is subsidising exports but surely other countries do so and they encourage their exporters.' Pleas for tax relief on export sales income have been made many times. If both suggestions—relief of income tax on export sales and an easing of restrictions on the home market—were followed up by Government, the results could well be boomingly beneficial.

It is, however, just as well for the country that so many of those who put up the occasional 'moan' do not wait for Government incentives but go all out for the exports which are an absolute essential for survival. Mr Liardet, for instance, reported that Simms' export business was 33⅓% up on the previous year. On the Government side, Mr Erroll, Minister of State, Board of Trade, said in a speech last week, 'The real incentive to export in an economy such as ours, which depends upon a large volume of imported goods and raw materials, is that every enterprise simply must maximize its sales and its profits . . . a reasonable balance between home and export sales is vital.'

NEWS *Briefs*

JAPAN PLASTICS OUTPUT 60% UP — US TAKES LESS THAI RUBBER—BFG VINYL PLANT OPENS MORE HUBER BLACK—SHELL ISOPRENE PLANS

●**France** — Société Dispersion Plastique, a joint Franco-German company set up by the Badische Anilin- and Soda-Fabrik, Ludwigshafen, and the Kuhlmann group, recently started the production of styropor. BASF's expanded polystyrene factory at Villers-St. Paul, has been planned to cover the French market.

●**Austria** — German packaging material manufacturer, J. A. Schmalbach AG, Brunswick, has established a subsidiary in Vienna—J. A. Schmalbach-Austria GmbH — which will have its own manufacturing plant near Wiener-Neustadt. Plastics packaging materials will be manufactured after an initial period.

●**United States** — Shell Chemical Company has acquired a site 15 miles west of Marietta, Ohio, for a multi-million-dollar polyisoprene plant. R. C. McCurdy, company president, said the action was in line with the programme announced last spring for expanding Shell's polyisoprene production facilities to a capacity of 120 million lb. a year.

●**Australia** — A £5m. expansion of British Nylon Spinners' plant at Bayswater, Victoria, Australia, will double the productive capacity and provide employment for an additional 400 men. Construction work will begin this month.

●**Tanganyika** — It is reported that the Michelin Tyre Company are to build a large factory at Arusha. Negotiations for a 14-acre freehold site in the industrial area are said to have been successfully concluded.

●**Japan** — 1959 plastics output was 438,000 tons — a 60% increase over the preceding year. This figure is given by the Japanese Plastics Industry Association who predict that 1960 production will reach 590,000 tons. PVC was the major material produced in 1959: 203,000. 114,000 tons of urea resin was produced and 33,000 tons of phenolic. Figures for polythene and polystyrene were: 26,000 tons and 17,000 tons.

●**Ceylon** — Substantial buying of rubber by Russia and Rumania in the Colombo market amounted to over 4,000 tons last week, according to trade quarters. The Ceylon rubber market was recently freed following the purchase by the Government of all the 17,000 tons of sheet rubber required to fulfil the current year's contract with China.

●**United States** — J. M. Huber have announced carbon black expansion plans. New plant will be installed in its Baytown, Texas, plant, and the aim is to expand capacity from 27,000 to 45,000 tons a year.

●**Switzerland** — A group of Swiss Banks are issuing their own bearer certificates for shares in Pirelli Societa per Azioni, of Milan. Each bearer certificate is for 10 original shares each of 1,000 lire nominal.

●**United States** — Vinyl film prints, manufactured by Dynamit Nobel AG, Troisdorf, Germany, have been added to the line of plastics products being marketed by Rubber Corporation of New York. Called Mipolam and Mipalette, these vinyl films were previously sold in USA through Georg von Opel Corporation, New York.

●**Canada** — Robinson Cotton Mills Ltd. plan to sell its two wholly-owned plastics subsidiaries to Monsanto Canada Ltd. W. W. Robinson, chairman, said that the reason for the sale was that large rubber manufacturers are switching from foam rubber production to plastic foam. Large chemical manufacturers who produce raw materials for plastics foams are acquiring foam producing subsidiaries.

●**Thailand** — Purchases of Thai rubber by USA have declined while Thailand has been increasing its rubber exports to other countries, according to the chairman of the board of export promotion. Two years ago when Thailand's rubber exports totalled 120,000 tons annually, about 97% of the exports went to USA. At present, Thailand was exporting at a rate of 170,000 tons a year and exports to USA only represented 60% of the total shipments.

●**United States** — Production of vinyl resins and compounds has begun at the new Long Beach, California, plant of B. F. Goodrich Chemical Co. It is the company's seventh manufacturing plant in America, and is designed to allow for expected expansion. The vinyl monomer is obtained from the petrochemical plant of American Chemical Co. located near the new plant.

'Then, just about 2 o'clock we got the head back on and the night shift started.'—504

Rubber Stocks May Increase

INTERNATIONAL STUDY GROUP PREDICTS SURPLUS

THE increasing production of new type synthetic rubbers will exercise an important stabilizing influence on natural rubber prices at competitive levels, the International Rubber Study Group said on September 24.

The Prime Minister of Malaya, Tunku Abdul Rahman Putra Al-Haj, addresses delegates from all over the world at the opening session of the International Rubber Study Group meeting in Kuala Lumpur. (*Below*) **The Prime Minister examines samples and enjoys a joke with** (*left to right*) **James Bush (Natural Rubber Bureau), A. G. Pawson (secretary general, International Rubber Study Group), P. J. Debart (leader of the French delegation) and Hugh Rodway (Natural Rubber Bureau)**

In a final communique after the four-day meeting at Kuala Lumpur, the Group said it fully appreciated the importance of greater stability of the price of natural rubber to both producers and consumers, and to countries whose economies were largely dependent on the production of natural rubber.

The communique estimated that the world might consume some 2,070,000 long tons of natural rubber and 1,770,000 long tons of synthetic rubber, apart from synthetic rubber produced in non-member countries.

It was estimated that the world production of natural rubber would be 2,055,000 long tons and synthetic rubber production in member countries would be 1,940,000 tons, and that some 160,000 long tons of natural rubber would be delivered from Government stockpiles.

The communique added: 'The Group considered that the estimated surplus of natural rubber and synthetic rubber production over consumption of 145,000 long tons and 170,000 long tons respectively, would enable commercial stocks to be rebuilt to more normal level appropriate to the increased world consumption.'

The Group mentioned the impressive record of replanting with high-yielding material. It hoped that natural rubber-producing countries would continue replanting where necessary, and adopt all possible measures to increase efficiency of production to improve the competitive position of natural rubber.

Stereo-Regular Synthetics

'In the long term,' the communique said, 'it was felt that the increasing production of the new stereo-regular synthetic rubbers would exercise an important stabilizing influence on natural rubber prices at competitive levels. In the short term it was felt that a significant contribution to the reduction of excessive fluctuations could be made by a variety of measures including, for example, fuller, more accurate and more widely disseminated statistics and information with regard to scientific and technical developments and trends of production and consumption of natural and synthetic rubber. A number of these measures were considered by the group.'

The group introduced the management committee to study these measures and any other proposals submitted to it by member countries.

Countries attending the meeting were Australia, Belgium, Canada, Ceylon, Czechoslovakia, Denmark, France, West Germany, Indonesia, Italy, Japan, Liberia, Malaya, the Netherlands, Thailand, the UK, USA, and South Vietnam.

New Range of Polyesters

Astor Boisselier and Lawrence Ltd. are now producing polyester resins at their West Drayton works. They are being marketed under the trade name Polastor.

The company claims that the water absorption figure of these resins is extremely low, that they have a contraction rate of only 2-3% and that they have very good adhesion to metal.

It is understood that the price of these resins will be competitive with other materials on the market.

Work will begin immediately on a $500,000 expansion to the facilities at Du Pont's works, at Maitland, Ontario, for production of nylon intermediates.

New Licensees for Vinyl Products

Vinamul synthetic resin emulsions and Vinalak polymer solutions are to be manufactured in Austria and West Germany under licence from Vinyl Products Ltd. Agreements have been concluded with Reichhold Chemie AG, Breitenleerstrasse 97-99, Vienna XXII, and Reichhold Chemie AG, P.O. Box 1081, Hamburg.

These two firms are the 15th and 16th licensees of Vinyl Products Ltd., whose materials are also manufactured in Argentina, Australia, Brazil, Canada, France, Holland, Italy, Japan, New Zealand, South Africa, Spain, Sweden, Switzerland and USA.

Vinamuls are water based emulsions; the Vinalaks are solutions of vinyl resins in organic solvents. Vinyl Products is a member of the Reichhold Chemicals group.

Plastics Design Awards

£1,000 SHELL CHEMICAL COMPETITION

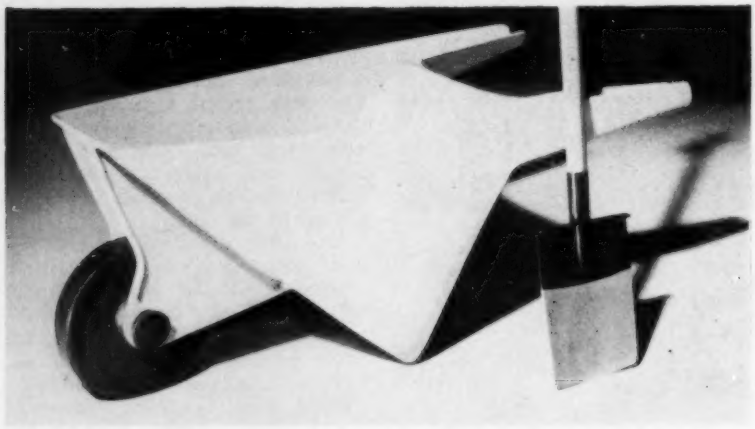
THE winners of the £1,000 plastics design competition sponsored by Shell Chemical Company Ltd. received their prizes from David Radford, chairman of the British Plastics Federation, at a ceremony at the Time and Life Building, New Bond Street, on September 26.

The competition's main purpose was to stimulate design interest in the polyolefin plastics shortly to be produced by Shell Chemical in the UK. Contestants had to submit designs of an article or appliance for the industrial, domestic, institutional or public services markets which could be made from Carlona polypropylene or high-density polythene. There were 395 entries and ideas ranged from a canoe to a complete wardrobe; from skis to litter baskets.

First prize of £500 was awarded to Frank Watkins of Fulham Road, Fulham, S.W.6, for his design of a lobster pot to be made in polypropylene or high-density polythene instead of traditional materials. The £300 second prize went to Martyn Rowlands of Maltings Lane, Epping, Essex. He submitted a model of a wheelbarrow which could be made of high-density polythene. Third prize winner was Bernard Sams of Mount View Road, Crouch End, N.4, who received £200 for his idea for a pair of washing tongs to be moulded in polypropylene. All the prize winners are industrial designers.

The panel of judges was Paul Reilly, Hon. F.S.I.A., director of the Council of Industrial Design, Robin Day, R.D.I., F.S.I.A., A.R.C.A., the industrial designer, N. A. Iliff, managing director, Shell Chemical, and V. N. Luke, commercial manager of the company's plastics and rubbers division.

As the owners of the designs, Shell are now considering the question of their further development.



The wheelbarrow in high-density polythene which won Martyn Rowlands the second prize of £300

Developing From Tradition

Lobster pots may seem a little fanciful; but 500,000 are in use every day along the Yorkshire and Northumberland coastline alone. The design is a development from traditional types of pot, with polypropylene or polythene replacing more traditional materials which require constant maintenance.

Additional advantages are that the hemispherical moulding will facilitate easy stacking in the boat and the screw-on base plate will allow fishermen to easily eject their catch when the pot is hauled in.

The second prize winner, Martyn Rowlands, is well known in the plastics field: while he was with Ekco Plastics he designed the baby bath which received the design of the year award for 1958. He is an active member of the Plastics Institute and chairman of its design committee.

Mr Rowlands' wheelbarrow 'takes advantage of shell-like forms so suitable to plastics mouldings.'

The designer gives precise directions for tooling. He indicates that the main body of the wheelbarrow is a simple sculptural form which would allow this tool to be made from a pair of castings for economy, although the webs that take the wheel would have to be separate moving blocks in the same tool. The blocks would move sideways away from the webs allowing strengthening ribs, the undercut profile, and the holes that take the wheel shaft, to be moulded. The wheel would be made from a simple tool with no undercuts, the tread area being thickened to withstand greater wear. The wheel shaft which has a moulded nib at one end to retain it in position would be made from a pair of splits with a core pin to give a hollow part free from sinking. A 200oz. injection moulding machine would have to be employed to produce a reasonable sized wheelbarrow, *i.e.*, 1ft. 6in. high, 1ft. 9in. across, 3ft. 6in. long.

Polypropylene was chosen by Bernard Sams for his washing tongs because of its resistance to boiling water, its low water absorption, and because it is 'gentle on clothes.' A moulded back spring and side catch will stand the repeated flexing of about 25° and is why polypropylene was chosen instead of high density polythene.

Precision Plastics Take Over

GAS Purification and Chemical Company Ltd. have taken over Precision Plastics Ltd. They have acquired the entire £45,000 of issued share capital, and a majority (77%) shareholding in Plyglass Ltd.

Gas Purification intend to transfer the company to the plastics division of A. B. Metal Products Ltd., a subsidiary. The net assets of Precision Plastics Ltd. amount to approximately £51,000. The net profit after all charges, but before tax, for the year ended September 30 1959 was £19,360, and it is anticipated that the profits for the current year will amount to approximately £22,000. The consideration for the purchase was £77,500 in cash.

Gas Purification say that they intend, through this new acquisition, to integrate and expand all activities of the group in the plastics field.

Plyglass Ltd. was incorporated in 1946, and is primarily engaged in the manufacture of double glazing units of all types, insulating panels and allied products. The net assets of this company amount to approximately £23,000 and although losses have been incurred in the past, it is anticipated that a profit of approximately £15,000 should be made in the year ending October 31 1960.

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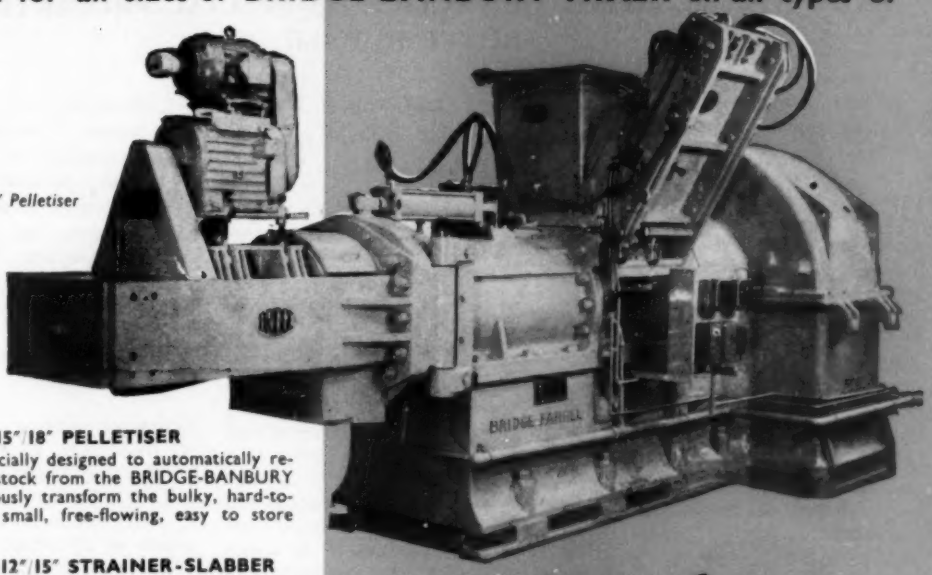

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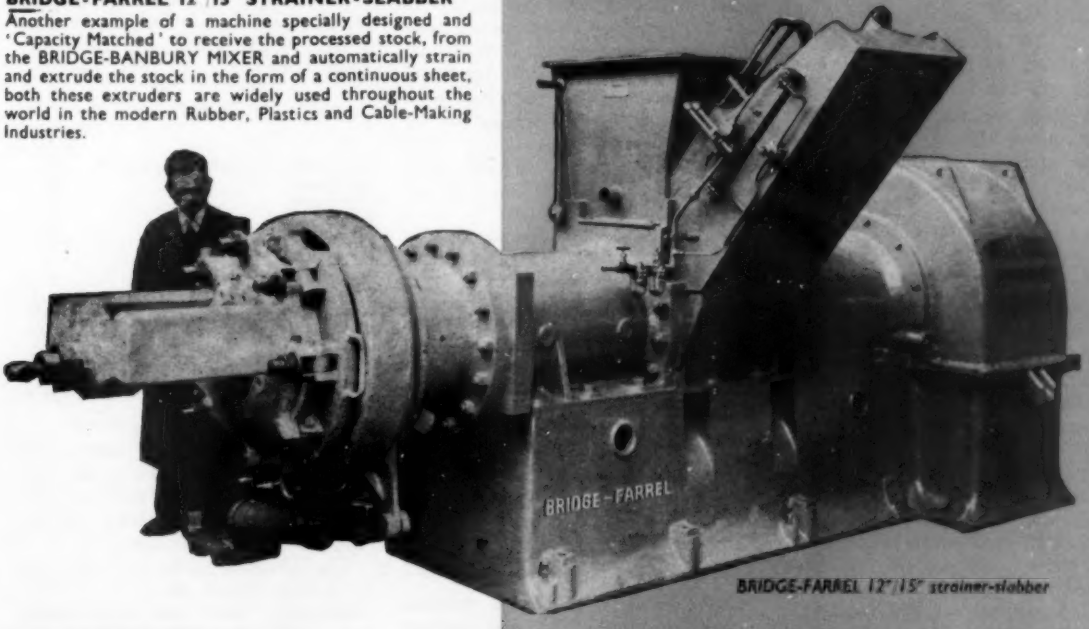

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Use of Factice in Butyl Rubber

PART III—THE EFFECT OF FACTICE ON SPECIAL PROPERTIES OF BUTYL RUBBER

By C. FALCONER FLINT
Ph.D., D.I.C., B.Sc., A.R.C.S., F.R.I.C., F.I.R.I.

(Director of Research, Factice Research and Development Association)

IN previous publications in this Journal (Falconer Flint and Donnelly, Nov. 1 and 8 1958), it was shown that a first-grade factice based on rapeseed oil is a valuable processing aid for use in butyl compounds. It was shown that as little as 5 phr of this factice

(a) gave complete control of the tendency of the butyl polymer to fly off the mill during the early stages of compounding and gave smoother compounds,
(b) reduced the time necessary for black incorporation on the open mill;
(c) was effective in controlling the heat collapse of butyl rubber compounds;
(d) considerably increased the extrusion rate;
(e) was very effective in removing memory (recovery) effects from uncured butyl compounds;
(f) in large measure corrected the defects which the 'Garvey die' test revealed in extrusion characteristics (10 phr gave complete correction);
(g) had a negligible effect on building up tack (large amounts of the factice appeared to increase tack perceptibly).

The effect of this factice on the rate and state of cure was found not to be significant in any adverse particular, some vulcanizate properties indicating a slight retardation, others a slight acceleration. The values of some properties (*e.g.* tearing energy) were enhanced by an addition of the factice. The effect of the factice on the oven ageing characteristics of the two butyl compounds studied appeared to be entirely satisfactory.

This demonstration that factice is a valuable compounding ingredient in butyl compounds, was based on a study of 12 vulcanizate properties and nine processing properties of the raw compounds. The results were so encouraging that it appeared desirable to finalize the demonstration by examining the effect of factice on a number of other vulcanizate properties, the high levels of which determine the choice of butyl rubber for the manufacture of consumer goods. The properties selected were:

1. Resistance to heat.
2. Resistance to organic and inorganic chemicals.
3. Resistance to permeation by gases (permeability).
4. Resistance to abrasion.
5. Resistance to outdoor exposure under strain.
6. Resistance to the passage of an electric current (volume resistivity).

Details of the results obtained are given below.

SUMMARY

In previous investigations (Falconer Flint and Donnelly, RJIP, Nov. 1 and 8 1958) it had been observed that a Grade 1 rapeseed oil factice is a valuable processing aid for use in butyl compounds. The effect of the factice on the rate and state of cure had been observed not to be significant in any adverse particular. It was therefore found desirable to complete this demonstration of factice as a compounding ingredient for butyl rubber by examining the effect of a Grade 1 rapeseed oil factice on six important service properties of butyl rubber vulcanizates. These properties, and the factice effects observed, were as follows:

Heat resistance: improved stability to 60 psi open steam and to hot (100°C.) air.

Chemical resistance: stability generally improved, or not significantly affected, by immersion in strong acids, alkali, hydrogen peroxide, butyraldehyde, acetone, and alcohol.

Gas permeability: effect negligible.

Abrasion resistance: improved abrasion resistance obtainable.

Outdoor exposure resistance, under strain: effect favourable.

Volume resistivity: a butyl vulcanizate containing 20 phr factice, tested after 14 days in water at 70 C., had a higher volume resistivity than a natural rubber cable dielectric containing no factice and tested dry.

The indication therefore is that the beneficial effects of this Grade 1 rapeseed oil factice as a processing aid for butyl rubber compounds can be utilized without prejudice to important service properties of the vulcanizates, and sometimes with benefit to these service properties.

Resistance to Heat

(a) *Resistance to Cycles of High Pressure Steam*

The following compounds (Table 1) were mixed on open rolls maintained at a surface temperature of 80°C., using a mill specially adapted to maintain constant roll temperature (Flint, Featherstone and Donnelly, *Trans. IRI*, 1957, *33*, 198, Fig. 7).

TABLE 1

	Parts by weight
Butyl rubber (high unsaturation)*	100
SRF black	25
FEF black	25
Zinc oxide	25
Mineral oil	5
Stearic acid	2
Polytrimethyldihydroquinoline	2
Selenium diethyldithiocarbamate	1.5
Sulphur	1.5
Factice (RO1)†	0, 5, 10 and 20

* Polysar Butyl 400

† Based on rapeseed oil, acetone extract less than 20%.

Tensile tests on open steam cures at 60psi indicated 30min. as the time to optimum cure. Treatment for 30min. at 60psi open steam was referred to as a curing cycle.

The following table (Table 2) gives the tensile results obtained on these compounds after one such curing cycle, after the cycle had been repeated six times, and also indicates the percentage change in physical properties of the optimum vulcanizate caused by the five additional curing cycles.

The effect of the higher factice additions in reducing modulus, reducing tensile strength, and increasing breaking elongation will be noted (Table 2). The compound would presumably be selected and adjusted to give optimum vulcanizate properties acceptable for service in the

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TABLE 2

Compound Description	300% Modulus psi 1 curing cycle	300% Modulus psi 6 curing cycles	% change	Tensile Strength psi 1 curing cycle	Tensile Strength psi 6 curing cycles	% change	Break Elongation % 1 curing cycle	Break Elongation % 6 curing cycles	% change
Blank (no factice) ..	430	517	+20	1,325	1,020	−23	642	520	−19
5 phr RO1 factice ..	333	354	+6	1,563	1,180	−24	775	660	−15
10 phr RO1 factice ..	265	256	−3	1,390	1,210	−13	758	675	−11
20 phr RO1 factice ..	250	221	−12	1,153	1,060	−8	791	785	−1

intended application. If this service involves exposure to high pressure steam, the indication is that a substantial addition of factice will reduce the changes that would otherwise occur in the tensile properties. Thus, in the presence of 20 phr of RO1 factice, modulus softens by 12% instead of stiffening by 20%, tensile falls by only 8% instead of 23% and elongation at break is reduced by only 1% instead of by 19%. Factice stabilizes this butyl vulcanizate to high pressure steam.

(b) Resistance to Prolonged Oven Ageing

Compounds (see Table 3) were mixed on open rolls. Optimum press

TABLE 3

	Parts by weight
Butyl rubber (high unsaturation)	100
FEF black	50
Zinc oxide	5
Stearic acid	2
MBT accelerator	0.5
TMT accelerator	1.0
Sulphur	2
Factice (RO1)*	0 and 10

* Based on rapeseed oil, acetone extract value less than 20%.

cure at 153°C. was assessed by means of tensile and hardness tests and was fixed at 40 minutes. Optimum press cures (40min. at 153°C.) were then oven aged for 56 days at 100°C. Tensile and hardness test figures before ageing are given in Table 4 and percentage change in these properties after oven ageing is given in Table 5.

The effect of the 10 phr addition of factice will be noted (Tables 4 and 5) as a 12% fall in tensile, a 24% increase in modulus, a 5% fall in hardness and an 11% decrease in break elongation. It will, however, be noted that the compound containing factice is more stable under heat, showing less tendency to change when heated for 56 days at 100°C.

Resistance to Inorganic and Organic Chemicals

(a) Inorganic Chemicals

Compounds (see Table 6) were mixed on open rolls at 80°C. Study

TABLE 6

	Parts by weight
Butyl rubber (high unsaturation)*	100
Zinc oxide	5
Stearic acid	2.5
SRF black	70
Graphite	30
MT black	25
MBT accelerator	0.5
TMTMS accelerator†	3
Sulphur	2
Factice (RO1)‡	0 and 5

* Polysar Butyl 301.
† Tetramethylthiuram monosulphide.
‡ Based on rapeseed oil, acetone extract value less than 20%.

of these compounds during press cure at 153°C. by means of a cure-recording instrument suggested 25 minutes as time for optimum cure in the case of both compounds, and this was confirmed by tensile and hardness tests. The tensile and hardness values determined on these optimum cures (25 minutes at 153°C.) are given in Table 7.

TABLE 4

Compound Description	300% Modulus (psi)	Tensile Strength (psi)	Break Elongation (%)	Hardness (°BS)
Blank (no factice) ..	700	1,950	700	64
10 phr RO1 factice ..	870	1,720	620	61

TABLE 5

PROPERTY CHANGES CAUSED BY 56 DAYS AT 100°C. EXPRESSED AS PERCENTAGE (Hardness change expressed in °BS)

Compound Description	300% Modulus	Tensile Strength	Break Elongation	Hardness
Blank (no factice) ..	+46	−36	−39	−3
10 phr RO1 factice ..	+18	−29	−34	−1

The percentage change in these properties after 14 days' immersion at room temperature in five different inorganic chemicals is given in Table 8. Tensile test pieces were cut, measured for thickness, immersed for 14 days, blotted dry and at once tested. The five chemicals used in this test of chemical resistance were:

70% (i.e. 25N) sulphuric acid
26.4% (i.e. 8N) hydrochloric acid
26.4% (i.e. 6N) nitric acid
2N caustic soda solution
100 vol. hydrogen peroxide

It will be seen (Table 7) that in the case of this formulation addition of 5 phr of RO1 factice increases tensile strength and break elongation, leaves hardness significantly unchanged and reduces modulus somewhat. From Table 8 it will be seen that differences, due to the factice, in the property changes are generally too small to be significant or tend towards stability. The exception is the fall in modulus apparently caused by the factice when 70% sulphuric acid is the immersion liquid used in the test. The result of this test is to suggest that a 5 phr addition of RO1 factice to a butyl rubber tank lining compound can be tolerated as

TABLE 7

Compound Description	300% Modulus (psi)	Tensile Strength (psi)	Break Elongation (%)	Hardness (°BS)
Blank (no factice) ..	630	858	575	72
5 phr RO1 factice ..	585	892	643	71

TABLE 8

PROPERTY CHANGES CAUSED BY 14 DAYS IMMERSION AT ROOM TEMPERATURE EXPRESSED AS PERCENTAGE (HARDNESS CHANGES EXPRESSED IN °BS)

Immersion Chemical Used	Hardness N/F	Hardness RO1	300% Modulus N/F	300% Modulus RO1	Tensile Strength N/F	Tensile Strength RO1	Break Elongation N/F	Break Elongation RO1
Sulphuric acid	+4	−2	+2	−18	+9	+7	+6	−3
Hydrochloric acid	+3	+4	+11	+8	+10	+7	+3	+1
Nitric acid	+2	+2	+9	+4	+10	+8	−2	+1
Caustic soda	+4	+4	+11	+5	+4	−3	0	−4
Hydrogen peroxide	+2	+3	+7	+6	−2	−5	−4	−3

N/F = No factice RO1 = 5 phr of this factice

regards both effect on physical properties and effect on resistance to inorganic chemicals. It will, however, be recalled that Part I of this paper in this Journal (Falconer Flint and Donnelly, Nov. 1 1958) described the beneficial effect on processing properties of a factice addition of this order, and this provides a positive reason for adding the factice.

(b) Organic Chemicals

Compounds (see Table 9) were mixed on open rolls at 80°C. Study of these compounds during press cure at 153°C. by means of a cure-recording instrument suggested 15 minutes as time for optimum cure in the case of both compounds, and this was confirmed by tensile and hardness tests. The tensile and hardness figures

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determined in these optimum cures (15min. at 153°C.) are given in Table 10.

TABLE 9

	Parts by weight
Butyl rubber (high unsaturation)*	100
Zinc oxide	5
Stearic acid	1
FEF black	75
Paraffin wax	6
Petroleum jelly	5
TMTMS accelerator†	1
Tellurium diethyldithiocarbamate	3
Sulphur	1.5
Factice (RO1)‡	0 and 5

* Polysar butyl 301.
† Tetramethythiuram monosulphide.
‡ Based on rapeseed oil, acetone extract value less than 20%.

The percentage changes in these properties after 70 hours immersion at room temperature in three different organic chemicals are given in Table 11. Tensile test pieces, previously measured for thickness, were immersed for 70 hours, blotted dry, and at once tested. The three organic liquids used were:

Butyraldehyde
Acetone
Ethyl alcohol

TABLE 10

Compound Description	300% Modulus (psi)	Tensile Strength (psi)	Break Elongation (%)	Hardness (BS)
Blank (no factice)	720	1,300	570	74
5 phr RO1 factice	620	1,300	625	74

TABLE 11

PROPERTY CHANGES CAUSED BY 70 HOURS IMMERSION AT ROOM TEMPERATURE EXPRESSED AS PERCENTAGE (HARDNESS CHANGE EXPRESSED IN BS)

Immersion Liquid Used	Hardness		300% Modulus		Tensile Strength		Break Elongation	
	N/F	RO1	N/F	RO1	N/F	RO1	N/F	RO1
Butyraldehyde	N.D.	N.D.	−7	+2	−5	−5	−11	−12
Acetone	−2	−1	+18	+26	+5	+3	−12	−8
Ethyl alcohol	−1	−1	+26	+32	+8	+4	−11	−12

N/F = No factice RO1 = 5 phr of this factice

It will be seen (Table 10) that in the case of this formulation, an addition of 5 phr of RO1 factice slightly reduces the modulus, slightly increases elongation, but leaves tensile and hardness unchanged. As regards resistance to these organic liquids, it would appear from Table 11 that with respect to tensile and break elongation, the effect of the factice addition is either without significance, or reduces the change due to the immersion. Factice apparently increases the tightening of the modulus caused by the immersion.

Here, again, the factice addition could apparently be tolerated as regards effect on resistance to the organic chemical, but beneficial effects on the processing properties of the compound would afford a positive reason for the factice addition.

Resistance to Permeation by Gases (Permeability)

Compounds (see Table 12) were mixed on open rolls at 80°C. Tensile tests on sheets press-cured at 141°C. suggested 25 minutes as a suitable cure in the case of all four compounds. The tensile results obtained at this cure are given below in Table 13.

TABLE 12

	Parts by weight
Butyl rubber (high unsaturation)*	100
SRF black	35
FEF black	15
Zinc oxide	5
Mineral oil	25
PBN antioxidant	0.25
MBT accelerator	0.5
TMT accelerator	1.0
Sulphur	2
Factice (RO1)*	0, 5, 10 and 20

* Polysar butyl 301.
† Based on rapeseed oil, acetone extract less than 20%.

It will be noticed from Table 13 that, in this butyl formulation, modulus and break elongation remain substantially unaffected by the addition of up to 20 phr of this factice. At 10 phr of factice, the fall in tensile strength amounts only to 10%.

Sheets of the above compounds were press-cured (25 mins. at 141°C.) against polished plates to a thickness of 0.02in. and permeability to nitrogen at 40 psi was measured over a period of 60 minutes at 50°C. The results obtained are given in Table 14.

TABLE 13

Compound Description	300% Modulus (psi)	Tensile Strength (psi)	Break Elongation (%)
Blank (no factice)	178	1,732	832
5 phr RO1 factice	152	1,677	837
10 phr RO1 factice	155*	1,555	825
20 phr RO1 factice	161	1,048	837

* Estimated.

Commenting on Table 14 it will be seen that while addition of this factice does tend to increase permeability, the increases are barely significant. When 20 phr of the factice have been added, the permeability constant is only 1.23 times the no factice figure, and this permeability constant (2.1×10^{-8} c.g.s. units) is very low and shows that a high resistance to gas permeation is retained in the presence of 20 phr of this factice. For comparison, the permeability constant of a natural rubber gum stock tested under similar conditions is of the order of 9×10^{-8} c.g.s. units.

TABLE 14

Compound Description	Permeability constant (cgs units)	Change expressed as percentage of 'no factice' value
Blank (no factice)	1.70×10^{-8}	—
5 phr RO1 factice	1.9×10^{-8}	+12
10 phr RO1 factice	2.0×10^{-8}	+18
20 phr RO1 factice	2.1×10^{-8}	+23

Thus it has again been shown that in the case of another of the special characteristics of butyl rubber, a substantial addition of factice can be tolerated without prejudice to the property in question. The positive reason for adding the factice is, of course, to secure important advantages in processing properties.

Resistance to Abrasion

The compounds (see Table 15) were mixed in a Banbury internal mixer. Sheets press-cured at 153°C. were examined by tensile and hardness tests and 40 minutes at this temperature was selected as a suitable cure for all the compounds. The test results obtained at this cure are given in Table 16.

TABLE 15

	Parts by weight
Butyl rubber (high unsaturation)*	100
FEF black	50
Hard clay	25
Mineral oil	25
Zinc oxide	5
MBT accelerator	0.5
TMT accelerator	0.5
Sulphur	2
Factice (RO1)*	0, 5, 10 and 20

* Polysar butyl 301.
† Based on rapeseed oil, acetone extract value less than 20%.

Laboratory tests of abrasion resistance were carried out on these four compounds by means of the Croydon-Akron machine. The test discs were cured for an extra 10 minutes (50 minutes instead of 40 minutes at 153°C.) to compensate for the greater thickness of rubber. The results obtained are given in Table 17.

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TABLE 16

Compound Description	Hardness (°BS)	300% Modulus (psi)	Tensile Strength (psi)	Break Elongation (%)
Blank (no factice) ..	58	460	1,623	700
5 phr RO1 factice ..	55	439	1,429	700
10 phr RO1 factice ..	53	406	1,296	725
20 phr RO1 factice ..	51	279	1,055	700

It will be noticed (Table 17) that 5 phr of this factice appears actually to improve quite substantially the abrasion resistance of the compound, while as much as 10 phr has only a relatively small adverse effect (a 6% increase in abrasion loss).

Resistance to Outdoor Exposure Under Strain

The compounds (see Table 18) were mixed on open rolls. Compound A (which is that in Table 3) was known by much preliminary work to reach optimum cure in 40 minutes at 153°C. This was verified

TABLE 17

Compound Description	Volume lost (ccs per 1,000 revs.)	Change, expressed as percentage of 'no factice' value
Blank (no factice)	1.19	—
5 phr RO1 factice	1.00	−16
10 phr factice ..	1.26	+6
20 phr factice ..	1.35	+13

by Relaxed Compression Set tests and hardness tests in the case of the actual mixing used for the exposure tests. Compound C is referred to as compound (1) in the earlier papers by Falconer Flint and Donnelly (*RJIP* Nov. 1 and 8 1958) where the optimum cure is shown in Table 18 to be 30 minutes at 141°C. Relaxed compression set tests (*loc. cit.*) and hardness tests showed the optimum cure for the similar compound B also to be 30 mins. at 141°C.

TABLE 18

	Parts by weight A	B	C
Butyl rubber (high unsaturation)*	100	100	100
FEF black ..	50	—	—
GPF black ..	—	—	40
Whiting (natural) ..	—	50	—
China clay ..	—	40	—
Petroleum jelly ..	—	5	5
Stearic acid ..	2	—	—
Zinc oxide ..	5	5	5
Titanium dioxide ..	—	10	—
MBT accelerator ..	0.5	0.5	0.5
TMT accelerator ..	1.0	—	—
ZDC accelerator ..	—	2.0	2.0
Sulphur	2.0	2.5	2.5
Factice (RO1)† ..	0, 10 and 25	0 and 10	0 and 10
Paraffin wax (mp 53 C.)	0 and 2	—	—

* Polysar butyl 301.

† Based on rapeseed oil, acetone extract below 20%.

Sheets $\frac{1}{10}$th in. thick of these compounds were press-cured for 40 min. at 153°C. in the case of those based on formulation A, and for a range of times at 141°C. in the case of those based an formulations B and C. The sheets were then cut into narrow strips $\frac{1}{4}$in. wide which were each tied in an overhand knot and then exposed outdoors in the shade for 21 months. The observations made at the end of that period are given in Tables 19 and 20.

TABLE 19

STATE OF BUTYL COMPOUND A OPTIMUM VULCANIZATES AFTER 21 MONTHS EXPOSURE

	No wax	Containing wax
No factice ..	No cracks	No cracks
10 phr RO1 factice	No cracks	No cracks
15 phr RO1 factice	No cracks	No cracks

The effect of RO1 factice on the exposure cracking resistance of these butyl rubber compounds (Tables 19 and 20) is favourable.

This is the verdict of an actual long-term (21 months) outdoor exposure test. It is not uncommon, however, to use short-term ozone cabinet tests to speed up development work on weather strip compounds. The following instance is cited to show how misleading such tests can be if taken as an indication of comparative merit in outdoor tests likewise under strain.

Sheets $\frac{1}{10}$th in. thick from mixes B and C were press-cured for 30 minutes at 141°C. (optimum cure). Ozone exposure test pieces as described by Best and Moakes (*Trans. IRI* 1951, 27, 103) were cut from each sheet, stretched to 25% overall elongation (giving a range of strains from approximately 5% to 50% along the test piece) and exposed in this strained condition to an atmosphere maintained at 30°C. and containing approximately 100 parts of ozone per hundred million parts of air. A record was kept of the average number of hours exposure to this atmosphere required to break the test pieces from each compound. These observations are given in Table 21.

It will be seen (Table 21) that the test used an ozone concentration about 50 times the average atmospheric level. This high concentration was used in order to secure results in a reasonable time (about 7 days) with this ozone resistant polymer. These results were unfavourable to factice as a compounding ingredient for butyl rubber weather strip. Outdoor exposure tests, had, however, been put on at the same time. It took 21 months outdoor exposure to give deterioration even approaching that observed in the ozone cabinet tests. (Small wonder, then, that workers tend to rely on the ozone cabinet). These natural exposure ageing tests reversed the verdict of the ozone cabinet and showed factice in a favourable light.

TABLE 20

Compound Description	Time of cure at 141°C.	State after 12 months	State after 21 months
B (white), no factice	12′	Very deep cracks	Completely degraded
	20′	Very deep cracks	Completely degraded
	30′	Good	Good
	40′	Good	Good
B (white), 10 phr RO1 factice	12′	Medium cracks	Completely degraded
	20′	Slight cracks	Deep cracks
	30′	Good	Good
	40′	Good	Good
C (black), no factice	12′	Very deep cracks	Very deep cracks
	20′	Good	Good
	30′	Good	Good
	40′	Good	Good
C (black), 10 phr RO1	12′	Deep cracks	Deep cracks
	20′	Good	Good
	30′	Good	Good
	40′	Good	Good

Resistance to an Electric Current (Volume Resistivity)

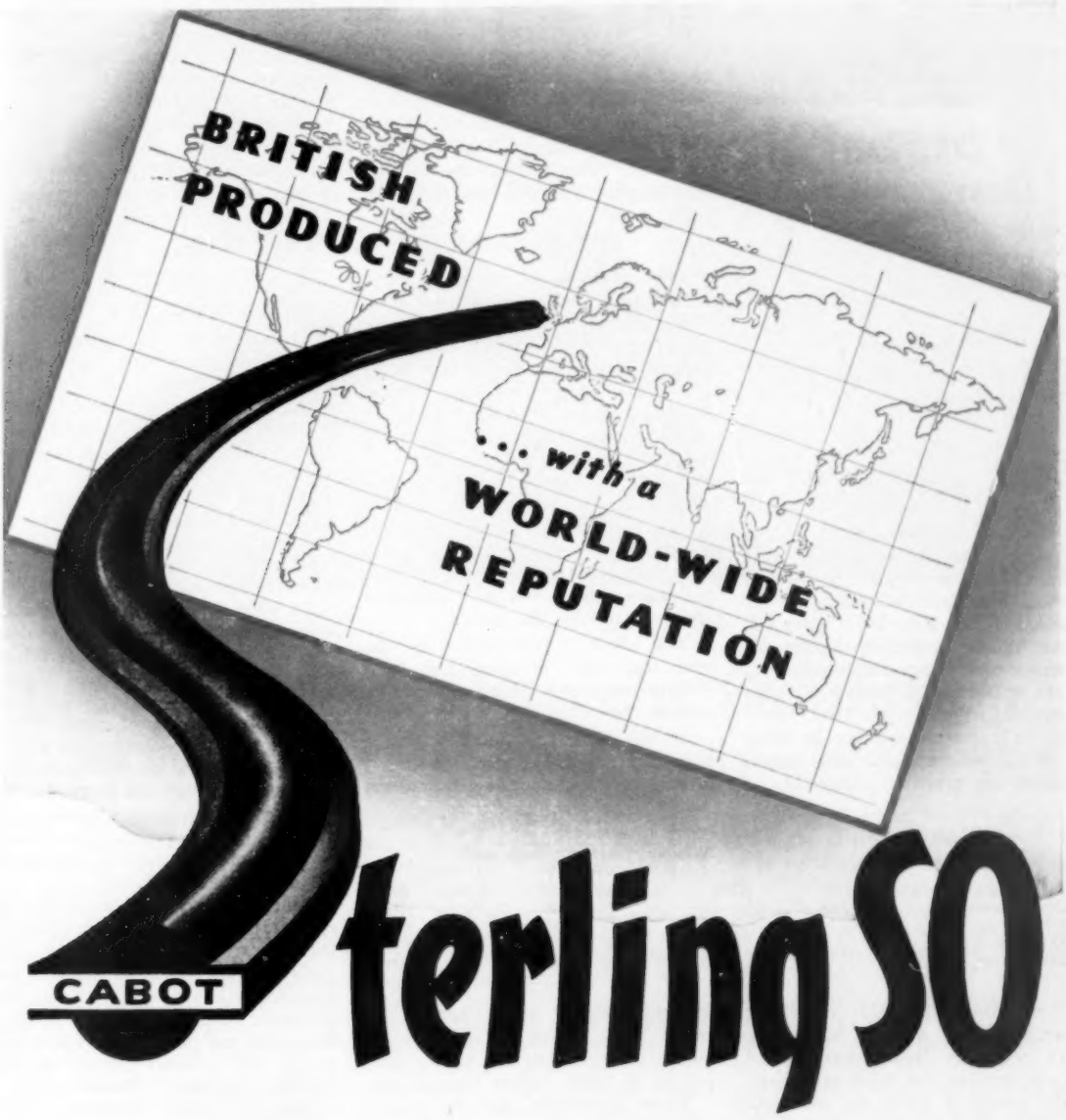
The compounds (see Table 22) were mixed on open rolls at 80°C.

In mixing these compounds, the four curing agents bracketed in Table 22 were added as a single master

TABLE 21

TIME IN HOURS EXPOSURE TO 100 PPHM OZONE FOR TEST PIECES TO BREAK

Base Compound Description	Blank (No Factice)	10 Phr RO1 Factice
B (white)	Still unbroken and in good condition at 174 hours	Broken between 104 and 132 hours
C (black)	Still unbroken and in good condition at 174 hours	Broken between 150 and 174 hours



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batch in a portion of the butyl rubber. Tests at 153°C. with a cure recording instrument suggested 50 minutes as a suitable press cure time for all the compounds, and this indication was confirmed by tensile tests.

TABLE 22

	Parts by weight
Butyl rubber (high unsaturation)*	100
Hard clay	95
MT black	12
Silica	14
Paraffin wax	5
Light calcined magnesia	5
Mineral oil	5
Stearic acid	1.5
p-p'-dibenzoylquinonedioxime	0.5
p-quinone dioxime	1.5
Red lead	5
MBTS accelerator	4
Factice (RO1)†	0, 5, 10 and 20

* Polysar butyl 301.

† Based on rapeseed oil, acetone extract value less than 20%.

Press-cured sheets (50 mins. at 153°C.) of these compounds were tested for volume resistivity (electrification 1 minute) according to the method of BS 903, 1956, part C2. Three volume resistivity figures are given for each compound, namely (a) before immersion in water, (b) after immersion in water at 70°C. for 7 days, (c) after immersion in water at 70°C. for 14 days. The results obtained are given in Table 23.

TABLE 23

Compound Description	Volume resistivity (ohms cms) Dry	Water: 7 days at 70°C.	Water: 14 days at 70°C.
Blank (no factice)	12×10^{16}	70×10^{15}	70×10^{15}
5 RO1 factice	5×10^{16}	30×10^{15}	30×10^{15}
10 RO1 factice	7×10^{16}	12×10^{15}	13×10^{15}
20 RO1 factice	3×10^{16}	2×10^{15}	2×10^{15}

Considering Table 23, it will be appreciated that at such high resistivity values as those shown by the dry vulcanizates the significant figure is the power of 10 in the measured resistivity. It is doubtful whether the apparent tendency of the factice to reduce volume resistivity is significant. The values obtained after immersion in water at 70°C. suggest that stability has been reached. The fall in resistivity after immersion now expresses the result in units of 10^{15} instead of 10^{16}. The suggested effect of the factice in lowering volume resistivity after immersion (70×10^{15} for the blank compound becomes 2×10^{15} when 20 phr of factice were used) is probably significant, but it will be realized that (a) this is apparently a limiting value for the effect of moisture, and (b) resistivity measured in units of 10^{15} is still a very high resistivity. A cable dielectric compound based on natural rubber and containing no factice had a lower resistivity when measured dry in the same way (1.2×10^{15} ohms cms.) and this fell on immersion in *cold* tap water to 0.1×10^{15} in 14 days. At this value, stability had evidently not been reached. The indication therefore is that this factice is a suitable compounding ingredient for butyl rubber compounds to be used as electrical insulating materials.

CONCLUSIONS

The investigation reported above started from the basis that a Grade 1 rapeseed oil factice had been observed to be a valuable processing aid for use in butyl compounds. It was found to give effective control of processing difficulties such as crumbling and roughness in mill mixing, heat collapse, dimensional instability ('memory' effects) and unsatisfactory extrusion characteristics. The time required for black incorporation on the open mill was reduced, and it was noticed that building-up tack was not unfavourably affected by the factice.

The effect of the factice on the rate and state of cure had been observed not to be significant in any adverse particular.

It was therefore found desirable to complete this demonstration of factice as a compounding ingredient for butyl rubber by examining the effect of a Grade 1 rapeseed oil factice on six important service properties of butyl rubber vulcanizates.

These properties, and the factice effects were observed as follows:

Heat resistance: improved stability to 60 psi open steam and to hot (100°C.) air.

Chemical resistance: stability generally improved, or not significantly affected, by immersion in strong acids, alkali, hydrogen peroxide, butyraldehyde, acetone, and alcohol.

Gas permeability: effect negligible.

Abrasion resistance: improved abrasion resistance obtainable.

Outdoor exposure resistance, under strain: effect favourable.

Volume resistivity: a butyl vulcanizate containing 20 phr factice, tested after 14 days in water at 70°C., had a higher volume resistivity than a natural rubber cable dielectric containing no factice and tested dry.

The indication therefore is that the beneficial effects of this Grade 1 rapeseed oil factice as a processing aid for butyl rubber compounds can be utilized without prejudice to important service properties of the vulcanizates, and sometimes with benefit to these service properties.

CDF LOAN TO DUNLOP NIGERIA

COMMONWEALTH Development Finance Company Ltd. has completed arrangements for a fifteen-year loan of £1m. to Dunlop Nigerian Plantations Ltd. of Calabar, Nigeria, a subsidiary of Dunlop Rubber Co. Ltd. £900,000 of this loan will be subscribed by Commonwealth Development, and the remaining £100,000 will be subscribed by Investment Company of Nigeria Ltd. The formal agreements are expected to be completed shortly.

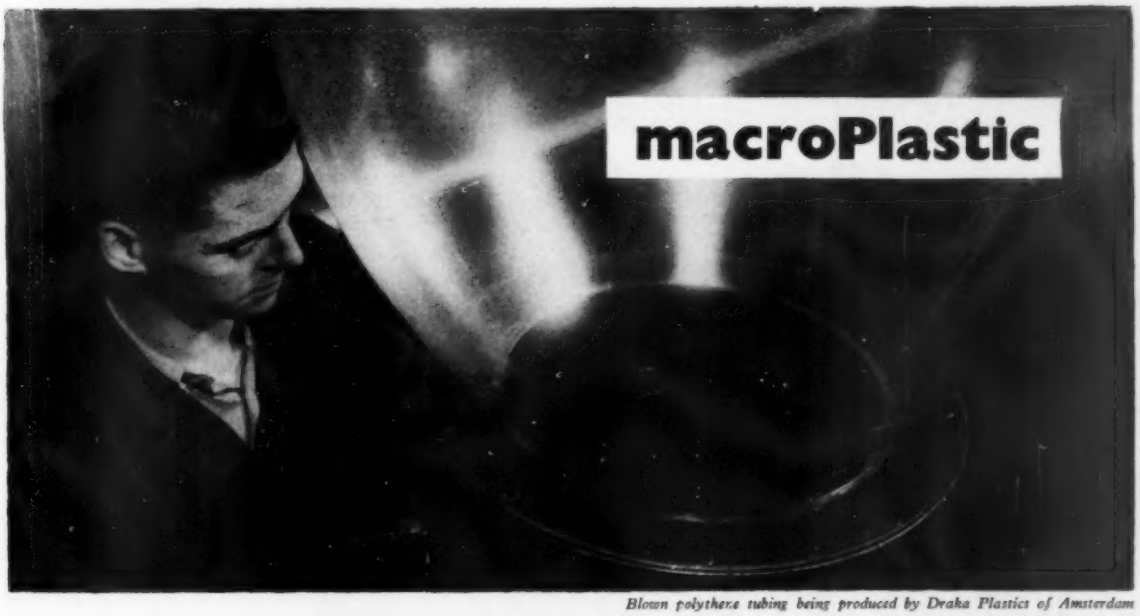
In 1956 Dunlop Nigerian Plantations initiated a programme of clearing and planting with rubber a large area in Calabar Province, Eastern Nigeria, and has already spent £1m. on the preparation of some 11,000 acres out of an ultimate total area of 21,000 acres, and on the construction of housing, factory and hospital buildings, with the necessary roads, water and electricity supplies. The loan is to be used as a contribution to the further finance required.

Climatic and other conditions are considered to be very favourable to the growth of rubber, and yields comparable with those in Malaya are expected. The project will give employment to several thousand Nigerians and provide a valuable new source of natural rubber on the Atlantic seaboard. Production on a commercial scale is expected in 1963.

Mr Bo Sarno

Mr Bo Särnö, one of the members of the original Board of the Sveriges Gummitekniska Förenings (Swedish Rubber Group) died in Stockholm on September 10. President of the Group since 1952, Mr Särnö had an international reputation in the rubber industry and will be sadly missed by his many friends. His outstanding personality and ready turn of wit made him an inspired chairman of the SGF technical and social activities.

Mr W. M. Meacham has been appointed a director of Andersons' Rubber Company and will continue as secretary.



Blown polythene tubing being produced by Draka Plastics of Amsterdam

Preview of the Utrecht Exhibition

SIX HUNDRED EXHIBITORS FROM SEVENTEEN COUNTRIES

MORE than 600 exhibitors from 17 different countries have already booked space at the macroPlastic exhibition, which is to take place in Utrecht from October 19 to 26 in the five halls on the Croeselaan site. The exhibition will occupy more than 390,000 square feet of space and will be divided among the halls as follows.

Bernard and Merwede halls: Raw materials, synthetic resins, moulding powders, granules and other compounds; chemicals including plasticizers, solvents and stabilizers; ancillary materials such as pigments, dyes, release agents and fillers; film, foil, sheet, tubes, powder and other semi-finished products; finished technical products.

Margriet hall: Processing machinery; injection moulding machines, extruders and presses; finishing machinery, vacuum forming machines, welding equipment, grinding and polishing machines; control, measuring and testing equipment, dies moulds and other ancillaries.

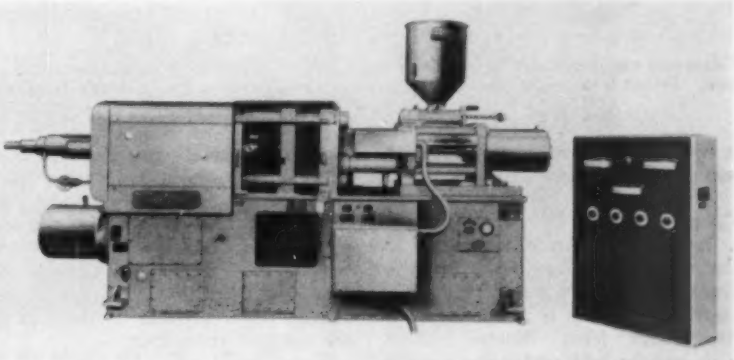
Juliana hall: Finished products including household and sanitary articles, laboratory equipment, toys and packaging materials.

Hall C will be devoted to collective information stands, books and periodicals. A plan of the site appeared in *RJIP* August 13, 230.

Information Hall

One of the main difficulties for the visitor to exhibitions today, thanks to their size and complexity, is that of building up an objective picture of the exhibition as a whole and of the application developments in the particular branch or branches of the industry in which he is involved. With this in mind the organizers have made a departure from established practice. As well as dividing the exhibits into groups as detailed above, hall C is to be in effect a visual catalogue of the exhibition.

In this hall the most characteristic aspects of plastics and applications displayed elsewhere will be repeated, divided into branches of industry. These will give a picture not only of developments up to date but also those which may be anticipated in the near future. This branch grouping of typical plastics applications, supplementing those on the actual stands, will provide the visitor with an imme-

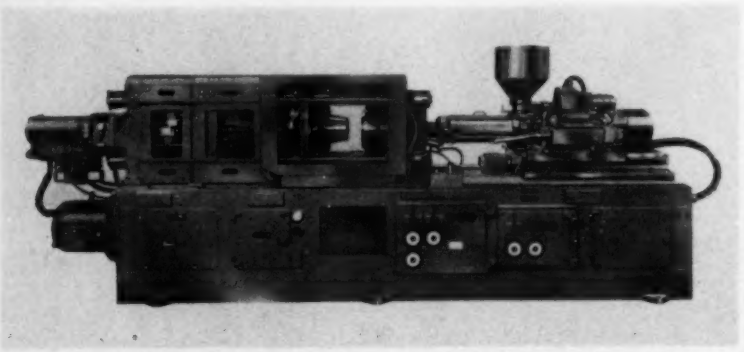


Peco model 30.MS.30 Mark 2, fully automatic injection moulding machine fitted with thermax plasticizing chamber, three-zone heat control and with shot capacity of 127/240g. will be shown

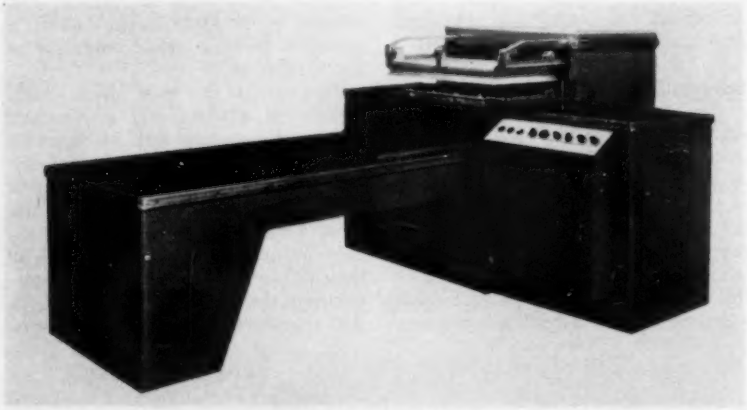
diate picture of developments in his field.

There are nineteen sectors in which can be found those products which reflect exceptional achievement on the part of an exhibitor or are of special application. Each sector will provide advisory services under the auspices of a neutral, non-commercial organization representative of the branch of industry concerned.

Information sessions will also be organised for the trade during which film shows and lectures will be given. Collective visits to the hall are planned, together with visits by individuals and groups from colleges and other branches of science.



SP 29 injection moulding machine made by R. H. Windsor Ltd., fitted with their most recent single-screw preplasticizer. This will be shown at the exhibition moulding articles in rigid PVC



Universal vacuum-forming machine recently developed by Schulte-Maschinenbau. Fitted with automatic feeding table, this machine has a drape-forming height of 20cm.

Congress

Immediately preceding the exhibition, an international congress (the first of its kind) on the technology of plastics processing is to take place in Amsterdam from October 17-19. This will be held under the auspices of the Association for the Advancement of the knowledge of Materials, the Royal Institute of Engineers and the Royal Netherlands Chemical Association. The congress will provide an opportunity for the scientists to meet those whose task it is to turn plastic raw materials into useful products, and to exchange views to their mutual benefit.

'Two worlds will meet at this congress,' said Professor Dr A. J. Staverman. 'The congress will have to show what the scientists have to offer the practical men. This initial meeting at international level is in the nature of an experiment and one which I hope will succeed. On the one hand there is the danger that it could become too scientific and on the other hand there is the danger that it will produce excessive summing-up of purely practical experiences.' Prof. Staverman is senior lecturer in organic and physical chemistry at the Leiden University and is chairman of the congress committee.

Two speakers who will give plenary session lectures during the first two mornings of the congress are Dr J. Overhoff, Director of the Royal Dutch Shell Plastics Laboratory in Delft, and Mr J. Butler, A.M.I.Mech.E., of British Industrial Plastics Ltd. As with the exhibition the talks at the congress are split into the following three groups. (1) Processing techniques and principles of machine design. (2) Processing behaviour of specific plastics. (3) Miscellaneous processing techniques including reinforced and foam plastics.

Art and Plastics

As has been demonstrated by some design artists, notably Arthur Fleischmann (*RJIP* September 3, 363) plastics are outstanding materials for creative art. The organisers of macro-Plastic are anxious that, if possible, a number of young Dutch artists should make contributions in this field, which could be shown at the exhibition. A group of sculptors has been approached and a competition has been organised in an effort to stimulate them. It is not as yet possible to say whether any suitable works of art will be forthcoming, however the fact that the artist today cannot afford to close his eyes to the possibilities of these new materials is in itself a challenge.

Judging from the information available at the present time the machinery section will contain examples of the products of most of the leading manufacturers of plastics processing machinery in Europe. Among the British contingent are BIP Engineering, R. H. Windsor, Peco, Cravens and Iddon Bros. A line shown by Peco will be their 30MS30 Mk. II machine. This is a

Low - pressure polythene - moulded chair made in sections and assembled with simple snap on fixtures. Protected by patent applications, this chair will be shown by Brillant Plastics NV

Continued on page 508

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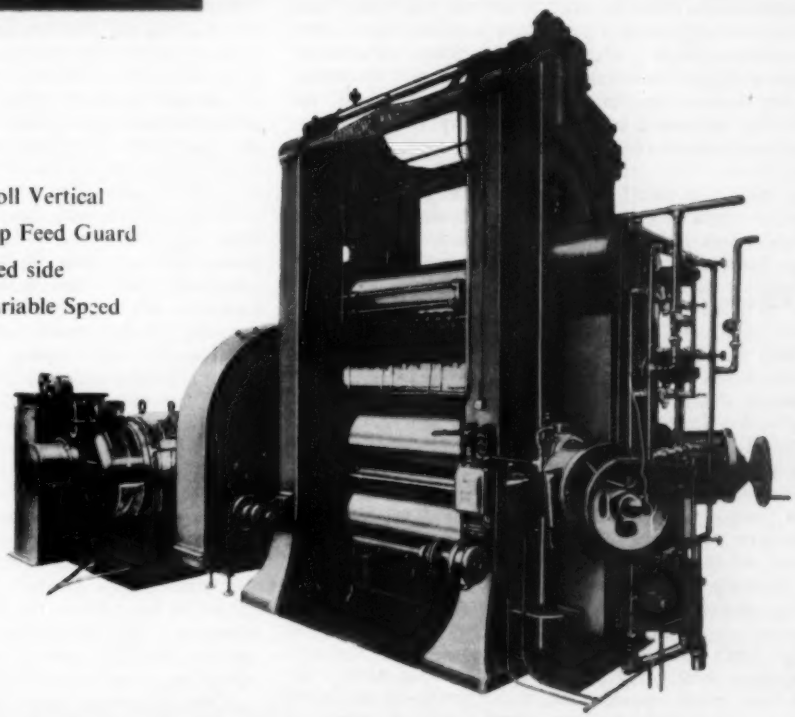

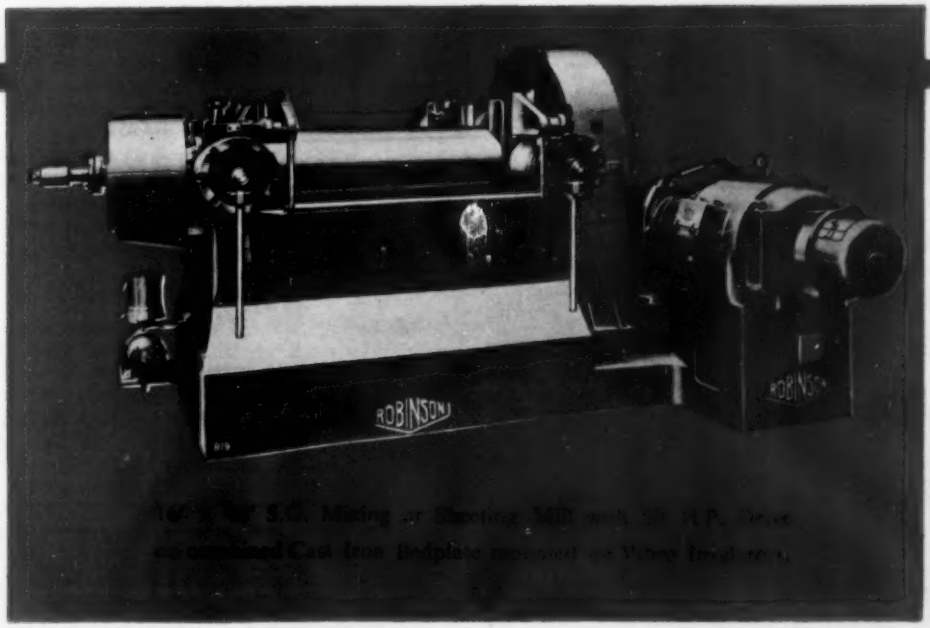

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VIEWS and REVIEWS

THE high-polymer industry—whether rubber, plastics, fibres—is a scientific one. Gone are the days of the 'old rubber dog' with a bite more accurate, or at least more informatively useful, than a physics laboratory. Manual skill and experience are still valuable, of course, but they cannot originate technological change of the complexity demanded by modern industry. For this, two things are needed: scientific knowledge and the will to apply it.

On these subjects I have been reading recently two papers, a stimulating address to the Plastics Institute by Lord Verulam, and a depressing lecture to last year's British Association meeting by Professor John Jewkes.

The Adventurous Spirit

Lord Verulam, who is Chairman of the British Institute of Management, delivered the Reardon Smith Lecture last April under the title 'The Brink of the Unknown,' and it is now published in *The Transactions of the Plastics Institute* vol. 28, August 1960, No. 76. Pp. 160-4.

Anyone who can start such a lecture by confessing, as he does, that he cannot distinguish between a polymer and a potato, earns our interest at once, apart from the importance and urgency of the theme, which can be summarised in his own words.

'I believe that the future of Britain, and particularly perhaps of industrial Britain in its world context . . . depends . . . on the extent to which we are prepared to venture forth into the unknown.'

Salvation will come not from one thing alone, not alone from better management, higher productivity, lower costs or improved designs—every one of these is important but none all-important. They are concerned with what 'is' and are therefore not enough because it is what 'might be' which governs the future.

We are learning painfully that coal and cotton are no longer kings, that Victorian ideas of management and trade unionism have little place in 1960, and that our only real asset does not appear in our balance sheets, skill of hand and mind. Amongst those skills is the habit of initiative, the readiness to try, to explore, to experiment.

Speaking of the founders of the high-polymer industry, Lord Verulam has a special word of commendation for Sir Henry Wickham's initiative which he couples with the work of Leo Hendrik Baekeland in founding an industry, on both sides of the Atlantic, with a 'record more spectacular than most, in its ability to break the limits of the known world in search of what is unknown beyond.'

For purposes where severe heat-resistance is not called for, 'polythene is sweeping out enamelled steel not by being a cheaper article but by being something better.' At the Terylene laboratories at Harrogate, he saw a staff of some 1,500 people of whom 300 are graduates . . . on the one hand finding new uses for Terylene and, on the other, searching diligently and systematically for other man-made materials with yet more dramatic qualities. Both polythene and Terylene are clear examples of applied research beyond the brink of the known, and of the rewards which are so great.'

National Characteristics

The Swiss, despite their lack of indigenous raw materials and of direct access to the sea, have a stable and successful economy because they are so inventive. Electric locomotives, automatic looms, chemicals, pharmaceuticals, watches, dairy products and many other Swiss products are examples of the 'swift translation of ideas into action, and action into products.' This, though not research in the accepted sense, is a development which advances knowledge of material things. Besides the Swiss, the Americans, Germans and Swedes all cultivate it; it bubbled forth in Britain in the 19th century and we must cultivate it more than we do now.

These 'sallies into the unknown' are not confined to large corporations. 'It is probably more important in small concerns than in large ones, because new and important ideas have a habit of being born in small concerns, where people are all-rounders, not specialists, and are therefore more accustomed to see both the wood and the trees at the same time.'

Lord Verulam then spoke about his visit to China and of the tremendous problem she has set herself ('to do in the twinkling of an eye what the industrial countries of the world discovered how to do a century ago'). Our task is even more difficult, he says, if less spectacular: 'it is the need, here in Britain, in the British Commonwealth and in the western world, to fire not only the enthusiastic, but far more the backward, the sluggish, the mentally lazy and the complacent to the comprehension that their sallies forward into the unknown within our industries are vital to the health and vigour of the whole economy.' Such advances are wanted not only in production methods but in office routines, sales methods, education, administrative practice.

Then he quotes some striking examples of backwardness (in New Zealand), of enterprise (in Australia and Hong Kong), and concludes by half-apologising that his message is so simple, but, he hopes, not too simple to be worthy of consideration. '. . . We as a nation are no longer the workshop of the world in the sense that we once were; nor can we ever again hope to have everything our own way, industrially, economically or strategically. . . . It is accordingly imperative that we develop what we have . . . more consciously and more intensively than ever before. That development means more technical education, more trained minds to explore the unknown in both scientific and industrial research and development . . .'

How Much Science?

There, in brief, are the views of a self-confessedly non-scientific but intelligent and well-placed observer of the international industrial scene. (Do read them in the original.) Professor Jewkes' presidential address to the Economics Section of the 1959 British Association meeting happens to deal with one of Lord Verulam's conclusions. It was entitled 'How Much Science?' and is published in *The Advancement of Science* vol. xvl. No. 62. Pp. 67-80. It begins: 'It is frequently said that Great Britain is suffering from a shortage of scientists and technologists and of the means for conducting research and development and, since the study of shortages is the main interest of the economist, I propose to examine the reasons usually given for making this statement and to speculate a little about how a community can satisfy itself that it is devoting sufficient of its efforts to scientific and technical matters.'

If I may be so bold, I suspect Professor Jewkes of a

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

little conscious perversity in pursuit of which he can be observed from time to time setting up Aunt Sallies to knock over and making great flourishes at straining at gnats. But it all adds gaiety to what might have become in other hands a dull and dreary treatment of a not very exciting topic. For instance, despite a preliminary profession of dispassionate objectivity, one of his basic contentions is quite unproved; it rests, in the last analysis on his personal opinion, *i.e.*, the statement 'which I do not believe to be the case.'

Be all this as it may, he presents very cogently a strong and unpopular case which, though very inconclusive merits attention from all who are in any way concerned with the place, kind, and degree of scientific and technological work in industry and the national economy.

He claims that we cannot have more scientists without having less followers of other intellectual pursuits and also without reducing our standard of attainments. 'The proportion of University graduates who fail even now is high (and incidentally it is higher in science and technology than in other subjects).'

Supply and Demand

He then distinguishes between 'shortage' in supply and 'unmet need' which means that demand itself is lower than it ought to be. As to supply and demand, he says: 'Even after making any reasonable allowance for death, retirement and emigration, it seems fairly certain that in these three years (1956-9) scientists were being produced by the Universities at a rate commensurate with the increase in demand as estimated by those who can be supposed to be in the best position to judge.'

The evidence he produces to prove this are that 'in the three years 1956-9 the total output of scientists from British Universities was in the neighbourhood of 18,000.' Those are his words and figures, and I understand them to mean that the annual output of scientists from our universities was about 6,000, and, from other evidence that it was tending to increase. As to demand, he quotes a Ministry of Labour inquiry which reached the conclusions that 'by 1959 the net additional demand for scientists would be about 9,500.' Again those are his words and figures. I understand then, that to meet a demand of 9,500 there is a supply of 6,000. This does not seem to me to justify the conclusion I quoted from him above that supply and demand are commensurate with each other but it seems, on the contrary, to show that there is a shortage.

To the second question: is there an unsatisfied social need for more scientists? he devotes most of the remainder of his lecture, distinguishing four main reasons used by those who answer in the affirmative, the fourth and last being the one advanced by Lord Verulam in his address. None of them is easy to determine statistically or logically, he holds, and it may be that some are in conflict, at least in the short run.

Comparing the British with the US output of scientists, he decides that, per unit of population, there is not much difference, and that expenditure on industrial research and development as a proportion of national income is about the same, but he has to make so many qualifications that he is not certain what the comparisons mean.

The Productivity of Science

He scrutinises the argument of the 1956 Committee of Scientific Manpower on the relationship between the growth in the economy and the number of scientists and technologists in employment. The committee held, to use its own words, that 'there is a definite relationship between the rate of increase of industrial production on the one hand, and the number of trained scientists and engineers employed by industry on the other.' Professor Jewkes is highly critical of this statement, the committee's evidence for which he describes as 'very sketchy' and points out that although between 1955 and 1958 there was an increase in the number of scientists and technologists employed in industry there was no increase in industrial production.

He also points ironically to the pessimism implicit in the assumption of such a relationship, which is that 'since the number of scientists and technologists moves in step with industrial production, output per head of scientists and technologists will not improve. . . . If this were true it would be a striking fact that scientists and technologists could economise in everything but themselves . . . if we accept the idea of a 4% annual increase in industrial production' (and a direct linear relationship), 'a short calculation shows that the number of scientists and engineers in Great Britain will have to increase from about 120,000 in 1955 to 5,171,000 in A.D. 2050. That is a lot of scientists and technologists.'

Well, really, if this is a sample of ostensibly logical reasoning by a leading economist, it is no wonder that scientific development is rapidly outstripping the economic capacity of industry to take advantage of it, and the sooner technologists take over from the economists the better for us all.

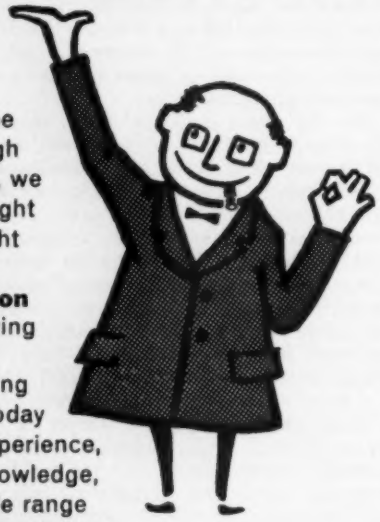
Two 'Sobering Facts'

And so the lecture goes on, emphasising again and again the lack of available data on which to base an opinion on this most important question. He advances two 'sobering facts': 'There has been an enormous increase in the US in the sums expended on industrial research and development since 1930, when the modern industrial research laboratories began to make their appearance, there does not seem to be any strong evidence that this has made steeper the general upward trend in output per head.' Looking at the experiences of different countries, there does not seem to be any obvious correlation between the rate of industrial expansion and the resources devoted to scientific and technological effort, because Japan, Germany and some other European countries have shown the biggest increases in industrial production per head, more than the USA and Great Britain, although they have not distinguished themselves in scientific and technological expenditure.

'My principal conclusion is that we should go on searching for better criteria for determining how much the community should devote to science and to technology.' So we come out by that same door wherein we went. I commend to Lord Verulam the thought that in appealing to the Plastics Institute for more adventure and initiative he is appealing to the already-converted and he should turn his attention to the economists and financial wizards in whose shortsighted power the scientist finds himself. At present.

CHARLES JENNINGS

It's what we put in it that counts!



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MEN *and* MATTERS

A Review of People and Events

by Peter Richards

ON September 13 a woman was rushed into the Norfolk and Norwich hospital. She was found to have an unusual case of bad haemorrhage in the oesophagus—the food-pipe which leads into the stomach. A specialist piece of rubber surgical equipment, called a sengstaken tube, was needed to save her life. This is necessary to control bleeding in the oesophagus.

Such tubes are not very often used —William Warne Ltd., of Barking, who supply them, sell only about three dozen a year—and the hospital didn't have one. The Theatre Sister telephoned William Warne and asked for emergency action to be taken, at any cost, to get a tube to the hospital. Peter Whitbread, assistant surgical sales manager, took control. He considered sending a car to Norwich, and Southend Airport were also prepared to send a plane, which would land at a local flying club. But the quickest method turned out to be by often maligned British Railways.

A call to the stationmaster at Liverpool Street started a swift chain of emergency action which culminated in the 3.30 p.m. fast train to Norwich making an emergency stop at Ilford Station. Hospital staff were waiting at Norwich Station and the package was rushed to the operating theatre.

The operation was successful, and the patient is now alive and well—thanks, Mr Whitbread told me, to teamwork. 'It was one of those occasions,' he said 'when, without a hitch, everybody worked successfully together.'

Scientists Visit Scientists

Members of the British Association for the Advancement of Science saw typical day-to-day activities in the laboratories of British Geon Ltd., British Resin Products Ltd. and Distrene Ltd., Barry, Glamorgan,

during a visit arranged as part of the programme for last month's annual meeting at Cardiff.

The visitors were welcomed by Dr J. J. P. Staudinger, technical director of the Distillers Plastics Group. They were then conducted through research, physical testing and technical service laboratories. These laboratories cover a wide field of work, ranging from research in organic and physical chemistry to practical applications of resin, and the specially arranged programme gave visitors a chance to see the full variety of activities.

In my picture members are seeing thin-gauge Styron polystyrene film being laminated to high impact Styron sheet.

Polymer Engineer in UK

Park M. Reilly, chemical engineering associate with Polymer Corp. Ltd., has left Sarnia on extended leave of absence to attend Imperial College, University of London. He will specialize in post graduate work in statistics for two to three years with a bursary of $3,000 a year from Polymer Corp.

Prior to joining Polymer Corp. in 1947 he was a chemical engineer at Welland Chemical Works Ltd. and a lecturer in chemical engineering at the University of Toronto.

In 1951 he became supervisor, process and equipment development in the chemical engineering department. His next move was in 1956 to supervisor, butadiene and utilities and in June 1958 he became chemical engineering associate in the petrochemical department.

At London, Reilly will study under Professor G. A. Barnard, a world authority on statistics.

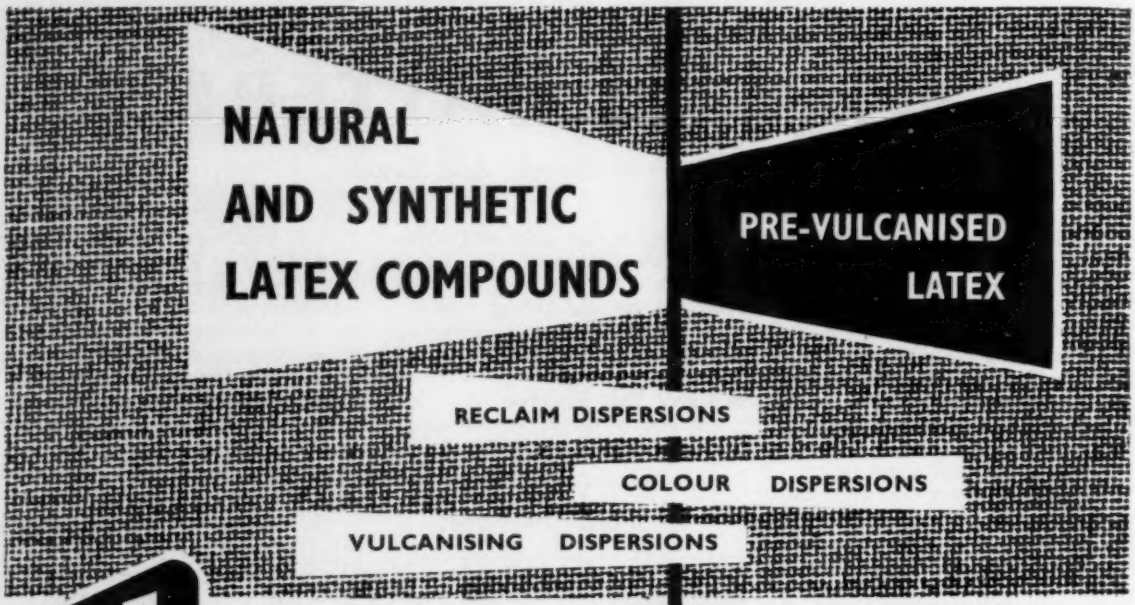
UC Sales Expansion

Union Carbide are expanding their sales-marketing organization. The company tells me that increased sales by the Chemicals Division of both imports from their associated company in USA and from their own Hythe plant has led to a number of new appointments.

R. C. Agabeg has been made product manager, imported chemicals; J. C. Marshall, product manager, manufactured chemicals; R. Woollam, assistant sales manager; R. O. Harvey, production planning co-ordinator; J. A. Bates, northern district manager.

Mr Bates will work from the

Final preparation in the transportation of the radiofrequency liner, a component of Nimrod, the giant atom smasher at present under construction at Harwell. To prevent dust from entering the unit it was enveloped in Bakelite's Vybak PVC film. Packaging was done by the Coventry firm of Autoprufe Ltd., using the RF weld seal method



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Manchester office. The others will operate from the new London headquarters at 8 Grafton Street, W.1.

Americans in Scotland

F. E. Lalley, the well known factory manager of the Heathhall, Dumfries, factory of North British Rubber is returning to America. Mr Lalley came to Scotland in 1955 from US Rubber, to which the 104-year-old Scottish firm is affiliated. The new factory manager at Dumfries is Mr G. H. Coston (pictured) who has been assistant factory manager for the past year. He came to this country from the American company's subsidiary at Mishawaka, Indiana, in the heart of the Middle West. The Mishawaka plant, employing over 6,000, is one of America's main centres for the manufacture of rubber footwear and general mechanicals.

Mr Coston, a native of Middletown, Ohio, is an A.B. graduate of Miami University and also has an M.A. degree of Harvard. He joined US Rubber 10 years ago and has spent his entire business career in the rubber industry.

Creamy and Dreamy

I have written before about the Formica Fortnight, which starts today (*RJIP* September 10, 390). The £1,000 'Heavenly Home' competition will certainly stimulate interest and encourage the general public to be more design conscious. A plan of three rooms and 15 new Formica decorative laminate patterns are given. The idea is to distribute these patterns about the rooms.

I was considering going in for the competition myself, but after a glance at the description of the new colours I have decided to leave it to my wife. When I see red, I see red. Green to me, oddly enough, is green. But one of the new colours, Tango Tweed, is not simply red. It is a warm and vital red, faintly shadowed, like pictures seen in a glowing fire. Avocado Tweed is not green. It is a dark, rich green, the lush colour of avocado fruit.

As I said, I will leave it to my wife. While she weighs the merits of Devon Cream Tweed (palest yellow and grey intermingled with white, in a cool and stippled effect) against Shell Pink Softglow (creamy, dreamy, gentle pink, restful and flattering), I will contemplate my favourite shade of mild and bitter.

Moving Footpath

On Tuesday, at long last, the Travolator — a sort of moving pavement — started operation between Waterloo and the Bank. Up till then it seemed as if damp, plaster and workmen had always been an indispensable part of that piece of Bank Station.

Almost half-a-mile of rubber handrail has been supplied to Otis Elevator Co. Ltd. by Silvertown Rubber Co. Ltd. (a member-company of the BTR Group) for the 315ft. long Travolator.

A unique feature of the handrail, which is designed by Otis, is the incorporation of a special steel strip — which minimizes rubber stretch. Supplied in four 656ft. lengths, the unvulcanized ends were spliced on site by BTR technicians.

A revolutionary departure from conventional tunnel-lining techniques has been made. 8,000 sq. ft. of Stelvetite has been used to cover 282ft. length of tunnel roof. Stelvetite is PVC bonded to steel, and is made by John Summers in co-operation with BX Plastics. John Summers say that it was chosen in this application because it resists dirt, damp and vibration. The Travolator uses a blue-brown coloured tweed finish.

Question Corner — 137

(Second Series)

462. What is the extrusion process for polythene sheeting, as distinct from film?

(Answer next week)

Answer to Question Corner — 136

461. The equipment required for coating wire with polythene is more complicated than for other extrusion processes.

Polythene coating of wire can be done at very high speeds. The uncoated wire is unwound from a system designed to maintain constant speed and tension, and generally consists of an input, or pay-off drum, and a capstan. As the polythene adheres better to a hot wire, the wire must be pre-heated before coating. This treatment also removes any moisture and drawing-die lubricant which may be left on and would be deleterious to good adhesion. The pre-heater may be a gas burner or an electrical resistance heater. Pre-heating temperatures may be as high as those of the extruded polythene.

The heated wire is then pulled through a coating die by means of another capstan driven at constant speed. After coating the wire is wound on to a drum, the speed of which is regulated to allow for the increasing diameter of the reel of wire.

The wire coating die is held in a cross-head which also holds the tapered guide mounted axially with the die. The extruder screw forces the polymer melt down and over the guide through which the wire is drawn, and out through the die in which the coating forms round the wire. The inlet to the die has streamlined contours so as to increase coating speeds.

The thickness of the coating wall, the type and condition of the extruder and the type of resin determine the temperature required for coating.

As in other polythene extrusion techniques, the extruded material must be cooled. This cooling is particularly necessary in wire coating so as to ensure an even distribution of the coating round the wire without voids and bubbles which might cause electrical failure. Wire speed and wall thickness determine the length of the cooling tank and for relatively thick coatings gradual cooling is desirable.

(Another question next week)

Polly Ester Says . . .

'Mercaptolate—dead Master of a cargo vessel'

UTRECHT EXHIBITION

Continued from page 500

fully automatic injection moulding machine giving shot capacities from 127/240g. Equipped with the Peco Thermax high capacity plasticizing chamber, giving higher plasticizing rates and reducing the cycle times on many operations, demonstrations on thin wall moulding will be given on this and other machines throughout the exhibition. R. H. Windsor are represented by Wilmod Compagnie N.V. and show three machines, the most recent of which is their SP 29 fully automatic injection moulder with in-line, single screw preplasticizer. Outstanding features of this machine include automatic sprue breaking, cycle delay equipment, flow control and infinitely variable screw speed. During the exhibition the machine will be moulding rigid PVC articles but is also suitable for polyamides, polypropylene and polycarbonates. The Dutch agents of Cravens Ltd., Sheffield are Lindeteves-Jacoberg NV and on their stand will be a recent addition to the range of British-built machines which Cravens produce under licence from the Hydraulic Press Manufacturing Company of America. The HPM 350-P-28 is an injection moulding machine of 28oz. shot capacity. It is all-hydraulic and is fitted with a preplasticizer and particular features include a clamp which permits fast and simple setting up of tools, a daylight of 34in. and stroke, which can be altered to any position within the limits of ram travel, of 22in.

Among the many German firms exhibiting either in person or through agents are Schulte-Maschinenbau GmbH of Dusseldorf, who manufacture vacuum forming machinery for skin and blister packing. This firm has recently been concentrating much effort on the production of deep drawn skins for lamination purposes including applications for suitcase shells, furniture elements and other casings. The machinery on show has been designed for these applications but is also suitable for a wide range of uses. The universal 60 machine is capable of producing a part 70cm. x 46cm. and has a drape forming height of 20cm., it is fitted with an automatically operated feeding table and the remainder of the operation is also automatic. The Schulte-press is for general purpose work and is suitable for processing rigid PVC sheets, but was mainly designed for glass reinforced polyester products. This press can also be used as a blowing press for acrylic sheet.

Extruded polythene tubing being laid for use under a skating rink to convey the cooling fluid. Manufactured by Draka Plastics, reputed to be one of the first firms in this field in Europe

A new addition to the range of extruders and ancillary equipment manufactured by Frieseke and Hoepfner GmbH is the SP 150, which has a 150mm. diameter screw and which includes the following features: hydraulic axial shifting of the screw with measurement of back pressure, infinitely variable speed regulator, electronic temperature control and infinitely adjustable heating capacity. The ancillary equipment includes foil blowing heads and cable heads, together with take off units and cooling tanks.

Extruders, dies and auxiliary equipment in styles and sizes to meet a wide range of production requirements are manufactured by Barmer Maschinenfabrik Aktiengesellschaft who are associated with the American firm Hartig-Extruders a Division of the Midland-Ross Corporation. Equipment is produced capable of blowing tubing up to 20ft. circumference, for sheet extrusion up to 72in. wide and ¼in. thick, wire insulation and cable sheathing and also for blow moulding laminating and vacuum forming.

Finished Products

A variety of thermoplastic and thermosetting articles are made by C. Alewijnse and Co. NV, including polyamide parts for washing machines, electrical mouldings in polyester, phenolic and melamine, urea record-player bases and other mouldings in PVC, polystyrene and methyl methacrylate.

Valve parts and lock washers made from nylon will be shown by G. Dikkers and Co. NV, who are also manufacturers of Dihalite moulding material.

Rheinische Gummi-und Celluloid-Fabrik are manufacturers of both rigid and flexible PVC sheet and foil, polystyrene and ABS foil and sheet, and polyisobutylene products, a selection of which will be exhibited.

The exhibit of Allied Chemical International will feature four types of material, these are alkyd moulding compounds, nylon moulding and extrusion compounds based on type 6 polyamide, low molecular weight polythenes widely used as additives in the processing of other polythenes and in both natural and synthetic rubber, and urethanes as coatings and as rubber and also as rigid or flexible foams.

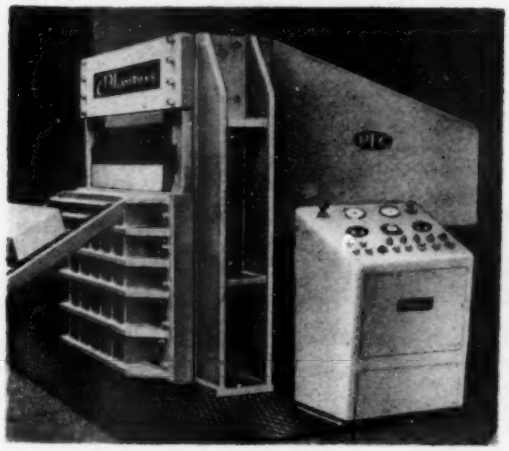
Illustrations are given here of two of the many finished products to be found in the exhibition. Draka Plastics of Amsterdam are producers of sheet, film, tube and extruded profiles and are reputed to be one of the first firms in Europe to extrude polythene piping. The tubing illustrated is being supplied to carry the refrigerating liquid to be used in a skating rink.

The chair illustrated is manufactured by Brillant Plastics NV, Amersfoort and is composed of standard low pressure polythene elements which can be snapped onto the tubular frame. These elements and the snap on fixtures are moulded together in one operation on a machine much smaller than has been the case with earlier moulded chair designs. These chairs are reported to be very comfortable, cheap and quick to assemble and to have considerable modern appeal for outdoor terrace and garden use.

Rubber Baling Press

DESIGNED FOR SYNTHETIC CRUMB

FOR many years, Planters Engineering Co. Ltd. and their associates, Entwisle and Gass Ltd., have specialized in the design and manufacture of natural rubber processing machinery for both plantation and factory. During recent years, much research and development work has been applied to the production of a range of machinery for the production and processing of synthetic rubbers. Amongst this range of synthetic rubber equipment is the 'Autobaler' which is capable of forming synthetic rubber crumb into high density bales of uniform size.



Synthetic rubber crumb baling press showing manual controls mounted on console cabinet which houses the automatic controls. Bales are ejected on to the conveyor at a rate up to 90 per hour

Throughout all stages of design and manufacture, care has been taken to produce a robust, well finished machine and to incorporate new techniques. Dry bearings and self lubricating materials are used extensively to eliminate the need for lubrication of moving parts. These, together with other modern features, ensure maintenance is kept to a minimum.

Each press is powered by its own independent hydraulic pumping unit and controlled by its own hydraulic and electrical system. Whilst the press is designed primarily for continual automatic operation, provision is made for manual control for setting up and test purposes. These manual controls are mounted on a conveniently situated Console type control cabinet which houses the automatic control gear. Output from the machine is very high and some 90 bales per hour can be produced. The size of each bale is 7in. x 14in. x 28in. and weighs approximately 75lb. (34kg.).

All the bales produced are of uniform density and have a smooth surface on all faces, with negligible flashing on edges of the bales. For bale identification where a number of presses are running, provision is made on the underside of the resistance slab to incorporate suitable dies for marking the bales with the required code letter or number.

The operating cycle is commenced by the delivery of the batch of synthetic rubber crumb into the baling chamber from an associated weighing unit. The resistance head is then moved across to seal the top of the baling chamber and the main pressure platen compresses the synthetic rubber crumb against the resistance head. The control equipment incorporates a dwell timer which governs the time the rubber crumb is held under pressure, and this can be adjusted over a wide range to suit the varying baling characteristics of the many types of synthetic rubbers at present being manufactured. At the completion of the dwell period, the main pressure platen is withdrawn slightly to remove pressure from the underside of the resistance head, following which the resistance head is withdrawn and the main pressure platen moved upwards to bring the underside of the finished bale level with the top of the baling chamber. At this point, the resistance head moves forward ejecting the bale onto conveyers which transfer it to the talc dusting and packing station. Meanwhile, the main pressure platen and the resistance head are being returned to the neutral position in readiness for the commencement of the next cycle.

Full electrical interlock protection is arranged on all moving parts and with the weighing unit to ensure that each movement is completed, before the next part of the cycle is signalled, thus eliminating any risk of moving parts fouling each other during any part of the working cycle.

For the protection of plant personnel, full interlock protection is also arranged on all guards covering moving parts to ensure that all protective devices must be properly positioned before the machine can function.

Reinforced Plastics Conference

DRAFT PROGRAMME

FOLLOWING the meeting held in Brighton in October 1958 the British Plastics Federation has now organised a Second International Reinforced Plastics Conference—'Problems, Practice, Prospects'—which will be held at the Cafe Royal, London, from November 30 to December 2 1960.

It is expected this will prove to be the largest gathering of material and equipment manufacturers, fabricators and users of reinforced plastics to take place in Europe. The programme has been designed to cater equally for the fabricator, the technologist and the user.

The first part will contain the following papers on production practice: Open Lay-up Moulds (C. C. Smith and N. W. Sutton, Mendip (Chemical Engineering) Ltd.); The Craft of Hand Lay-up (A. J. Bellworthy, C. F. Taylor (Plastics) Ltd.); Some Considerations in the Use of Resin-Glass Deposition Equipment (K. M. Grisley, Tepco Reinforced Plastics Co.); The Moulding of Reinforced Plastics in Matched Metal Tooling (T. P. R. Lant, De Havilland Propeller Co. Ltd.); Practical and Economic Considerations of Wound Reinforced Plastics Structures (A. W. Wilson, Bristol Aerojet Ltd.); Experiments in Moulding Techniques (J. Rees, Bristol Aircraft Ltd.); The Manufacture of Translucent Sheeting (C. Joseph, Fibreglass Ltd.); When Do I Mechanise? (J. E. Linsell, Microcell Ltd.), and Costing of Mass Production of Large Plastics Mouldings (C. H. King, G. H. Osborn Building Products Ltd.).

The session on Recent Advances in Materials, Processes and Design will contain: Properties of Glass for Plas-

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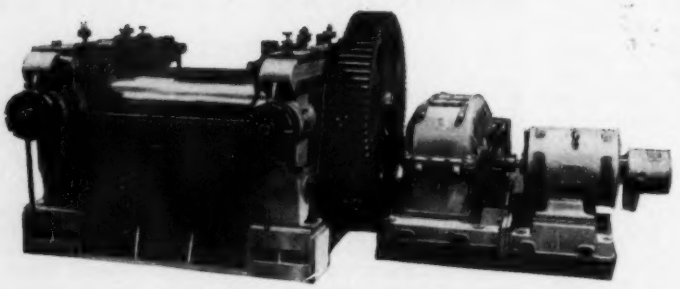

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tics Reinforcement (Dr L. Ainsworth, Turner Bros. Asbestos Co. Ltd.); Factors Affecting the Strength of Glass Fibres (Dr W. F. Thomas, University College of South Wales and Monmouthshire); Developments in the Field of Glass Fibres of Improved Mechanical Properties (K. Loewenstein, Glass Yarns and Deeside Fabrics Ltd.); The Effect of Mineral Fillers on the Mechanical Properties of Polyester Resins (Dr P. Delfosse, Pluess-Staufer A.G.); The Properties of Some Organic Fibre/Polyester Laminates (M. W. Holloway, Atomic Weapons Research Establishment, Aldermaston); Effect of Rapid Stressing on the Tensile Properties of Glass Reinforced Plastics (J. D. Matlack, Miss E. McAbee and Mr M. Chmura, Plastics and Packaging Laboratory, Picatinny Arsenal, New Jersey, USA); The Effect of Combined Stresses and Temperature on Creep of Plastics (Professor W. N. Findley, Brown University, Rhode Island, USA); The Effects of Heat and Mechanical Strain on the Electric Strength of Various Glass Fibre Laminates (J. H. Mason, Electrical Research Association); The NOL Ring Test for Quality Control of Glass Filament Roving (Dr Porter Erickson, Naval Ordnance Laboratory, White Oak, Maryland, USA); and Synergistic or Complementary Action of Mixed Catalysts (J. W. Cywinski, Novadel Ltd.).

A concurrent session on Engineering in Reinforced Plastics will contain: Some Practical Points concerning the Design and Manufacture of Reinforced Plastics Yachts and Boats (John Westell, E. W. Tyler and Co. Ltd.); Reinforced Plastics in the Chemical Industry (R. R. Guest, Prodorite Ltd.); Development of a Non-Destructive Test for Plastics (Dr S. Goldfein, US Army Engineering Research and Development Laboratories, Fort Belvoir, Virginia, USA); Problems Associated with the Use of Fibreglass Reinforced Plastics in the Heavy Electrical Industry (A. C. Kidd, English Electric Co. Ltd., Stafford); Supplying Materials and Structures to the Electrical Industry (K. Pollard and N. G. McCullagh, Permali Ltd.); Reinforced Plastics in Atomic Energy Plant (H. Wells and I. D. Aitken, UK Atomic Energy Research Establishment, Harwell); The Reinforced Plastics Vacuum Envelope for the 7GeV Proton Synchrotron (R. J. B. Hadden and R. Sheldon, Rutherford High Energy Research Laboratory, UKAERE, Harwell); and Reinforced Plastics for Tooling—An Attempt to Make Them Foolproof (H. Werrell, Kenilworth Manufacturing Co. Ltd.).

On the last day of the conference, B. T. Boswell, of the Ministry of Aviation, will give a paper on Structural Design Data, and B. Parkyn (Scott Bader) will ask — Have Reinforced Plastics Any Prospects?

IRI Golf

The last London section meeting of the IRI golfing society's season was held at Worplesdon Golf Club on Thursday September 22, the main competition being for the Sorbo Bowl. This was won by the Wallwork Cup holder, L. B. MacQueen with a total of 40 points. The runner-up was K. L. Langrish-Smith with 37 points.

The visitors prize was won by M. Simmonds with a total of 38 points, and the runner-up was G. C. Swann, secretary of the golfing society, with 35 points.

In the afternoon there was held a four-ball better-ball stableford competition which was won by A. Smales and A. McCulloch with 43 points, L. B. MacQueen and G. C. Swann coming second with 42 points.

C. D. S.

New Black Grade

Chance and Hunt Ltd., 5 St. Helen's Place, London, E.C.3, have introduced a new grade of carbon black to their range. This is Kosmos 70, an ISAF black. The price per lb. according to quantity is 9¾d.-10d.

Cooper Take Over Volaprene

Cooper and Co. (Birmingham) Ltd., felt manufacturers, have changed the name of their subsidiary, Cooper and Co. (Foams) Ltd. to Coopers Plastic Foams Ltd. This company has acquired Volcrepe Ltd.'s Volaprene division.

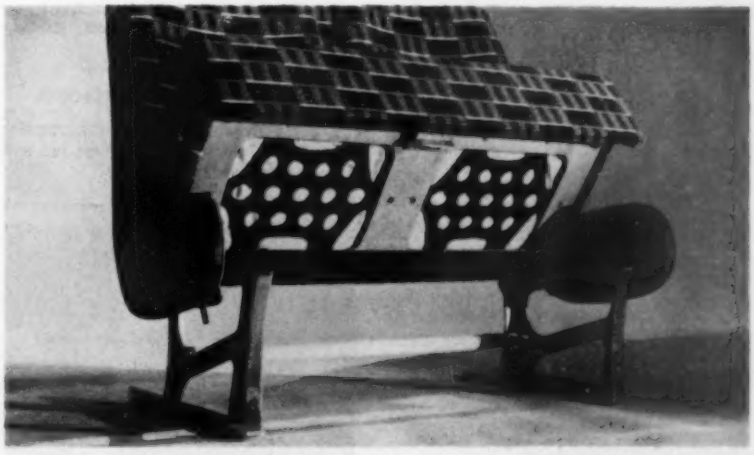
It is understood that all executive staff and works personnel formerly employed by Volcrepe in their Volaprene division are transferred to the new company, which will operate as the foam division of the Cooper Group.

The Division is a major producer of polyester and polyether flexible foam, in blocks and sheets. This new arrangement, which took effect on September 10, replaces an earlier announcement that Cooper were acquiring an interest in Volcrepe. This was never fully put into effect. The rubber manufacturing division of Volcrepe, Glossop, is not affected by these changes.

New Vitaweb Platform

AT the bottom of the improved seating in Plaxton coaches is a new Vitaweb resilient seating platform, produced by Vitafoam Ltd., displayed for the first time at the 1960 Commercial Motor Show.

The device absorbs road shock and is said to give a more stable ride by distributing passenger weight evenly around the bottom seat frame. Since the platform has a slight 'give,' larger persons sit slightly lower in the new seats, resulting in better alignment with the head roll.



The new platform is a web of $\frac{3}{32}$in. high tensile strength rubber suspended in the seat frame from six hooks, which are attached to non-corroding brass clips bonded into the webs during moulding. This simple hook-on design makes for low assembly and maintenance costs.

Large air holes in the Vitaweb platform permit air circulation up through the Vitaform seat cushion allowing it to breathe and resulting in cooler seating. The platform's resilience will also allow thinner foam cushions for some applications.

Pre-production flexing and ageing tests claim to show that the service life of the platform will equal or exceed that of the seat in which it is installed. No sagging is possible, even after prolonged use.

The vitaweb seating platform is produced by Vitafoam Ltd. of Manchester.

Rubber Statistics

MALAYA — USA — CANADA

MALAYAN shipments of sheet and crepe rubber in August totalled 74,459 tons compared with 74,597 in July and 88,609 tons in August last year, according to official figures released from Singapore.

Of the August shipments, the UK took 9,256 tons, USA 7,615, West Germany 6,467, Japan 6,496, the Soviet Union 7,110, China nil, Europe 22,394, Commonwealth countries 8,557 and other countries 6,564 tons.

Shipments of latex and revertex in the month amounted to 9,773 tons against 9,257 in July and 11,505 in August last year.

Of last month's shipments, the UK took 3,043 tons, USA 936, West Germany 1,055, Japan 1,116, the Soviet Union and China nil, Europe 2,550, Commonwealth countries 751 and other countries 322 tons.

United States

The United States Rubber Manufacturers' Association reports that total consumption of new rubber in August amounted to 125,409 tons against 114,642 in July. (All July figures mentioned here are revised.)

Consumption in August comprised 37,321 tons of natural rubber and 88,088 tons of synthetic (including 73,305 tons of SBR).

July consumption comprised 35,229 tons of natural and 79,413 tons of synthetic (including 67,853 tons of SBR).

Total synthetic rubber production in August was 121,809 tons against 116,584 tons in July, while production of SBR only was 98,585 tons against 95,584 tons in July.

Total synthetic rubber exports in August were 28,475 tons against 28,575 tons in July.

Canada

Consumption of rubber declined in July amounting to 7,401 long tons, compared to 9,189 long tons in the corresponding month of last year. For the first seven months, consumption also was lower at 64,529 long tons compared to 70,750 year before.

Consumption included 2,445 tons of natural rubber, 3,948 tons of synthetic and 1,008 tons of reclaimed (3,540, 4.450 and 1,199). For the seven months, consumption included 21,717 tons of natural rubber, against 25,837 tons a year ago, 32,772 tons of synthetic against 34,390 and 10,040 tons of reclaimed against 10,523.

Consumption of all kinds of rubber was lower in manufacture of tyres at 5,675 in July this year against 7,020 tons a year ago, and in the seven months rubber consumed for tyres and tubes amounted to 45,018 tons, against 49,742 tons the year previous.

Production of synthetic rubber in July amounted to 13,371 tons including 12,824 tons of synthetic rubber and 547 tons of reclaimed rubber, compared to 9,823 tons a year ago, including 9,217 tons of synthetic and 606 tons of reclaimed. In the seven months, production this year amounted to 96,469 tons including 92,731 tons of synthetic and 3,738 tons of reclaimed, against 45,578 tons a year ago including 41,955 tons of synthetic and 3,723 tons of reclaimed.

BOOK REVIEW

PLASTIQUES-REPERTOIRE DES FABRICATIONS 1960. 3 Rue Copernic Paris 16 ème (Postage 1 franc).

The 1960 Edition of this directory of 'Plastics' products is now available.

It has been enlarged to 146 pages, and is tabulated for easy reference. It has been designed for users of plastics materials on the look-out for speciality products — there are over 2,000 articles or items listed — as well as general conversion techniques practised by the principal members of the French Plastics Federation.

The Directory is free to purchasing offices of the trade, to commercial and professional organizations, wholesalers, retailers, licensed exporters, and users of plastics materials.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

Patent Specifications

Due to pressure on space this regular feature has had to be held over. It will appear next week.

The thin, surgical steel head of this new Remington shaver is protected by a clip-on guard made in BRP's Tyril 767 stryene-acrylonitrile copolymer

Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

July

HARRISONS AND CROSFIELD

London Asiatic.—1,698 (1,576). 7 mths—10,761 (10,048).
Oriental.—327 (265). 7 mths—1,871 (1,661).
Bukit Kajang.—109. 7 mths—746.
Lanadron.—467 (505). 7 mths—2,900 (2,863).
Pataling.—1,409 (1,315). 9 mths—11,720 (10,611).
Jugra Land & Carey.—470 (487). 9 mths—3,954 (4,198).
Golden Hope.—758 (730). 5 mths—3,391 (3,474).
New Crocodile.—264 (262). 5 mths—1,112 (1,137).
Castlefield.—295 (282). 1 mth—295 (282).
Holyrood.—93 (78). 7 mths—581 (483).
Hongkong.—33 (28). 7 mths—212 (187).
Hoscote.—281 (251). 1 mth—281 (251).
Killinghall.—47 (45). 1 mth—47 (45).
Kuala Selangor.—76 (72). 7 mths—463 (433).
Kulai.—192 (196). 9 mths—1,598 (1,802).
Malaysia.—63 (54). 7 mths—400 (360).
Prang Besar.—359 (257). 4 mths—1,288 (992).
Sandac.—78 (86). 4 mths—271 (296).
Seaport.—74 (65). 1 mth—74 (65).
Malayalam.—605 (208). 4 mths—2,723 (1,990).
Lunuva.—105 (108). 7 mths—675 (685).
Allied Sumatra.—822 (796). 7 mths—5,044 (4,969).
Asahan.—121 (132). 12 mths—1,153 (1,405).
Bah Lias.—154 (168). 9 mths—1,345 (1,338).
Central Sumatra.—72 (44). 1 mth—72 (44).
Lankat Rubber.—80 (62). 4 mths—272 (222).
Mendaris.—227 (198). 7 mths—1,155 (1,193).
Namoe Tongan.—245 (291). 11 mths—2,563 (2,612).
Sialang.—241 (202). 6 mths—1,185 (1,108).
Soengei Rampah.—49 (66). 7 mths—311 (352).
Tanah Datar.—86 (74). 7 mths—454 (461).
Tandjong.—165 (151). 1 mth—165 (151).
Toerangie.—207 (212). 9 mths—1,715 (1,711).
United Lankat.—35 (30). 7 mths—214 (188).
United Serdang.—957 (841). 11 mths—9,566 (9,318).
Bajoe Kidoel.—263 (429). 4 mths—987 (1,048).
Djasinga.—107 (109). 1 mth—107 (109).

THOMAS BARLOW

Bradwall (FMS).—174. 7 mths—1,004 (860).
Chersonese (FMS).—75. 7 mths—456 (399).
Highlands and Lowlands.—2,118. 7 mths—13,199 (12,756).
Krian.—8. 7 mths—40 (60).
Sungei Krian.—184. 7 mths—1,127 (1,043).
Muar River.—465. 4 mths—1,625 (1,634).

Grand Central.—943. 7 mths—5,949 (5,385).
Naggolle.—62. 7 mths—361 (258).
Doloswella.—24. 7 mths—151 (115).

Rubber Markets

LONDON

After a phase of uncertainty in a pausing market, the downward trend was resumed in sympathy with the East. Short covering and switching from near to distant positions featured trading. Factory demand remained small. The Study Group's estimate of surplus of production over consumption for 1960 tended to accelerate the decline.

Latest prices are as follows:
No. 1 RSS Spot: 28½d.-28¾d.

Settlement House:
November 28½d.-28¾d.
December 27⅞d.-28⅛d.
January/March 27½d.-27¾d.
April/June 27¼d.-27½d.
July/September 27d.-27¼d.
October/December 26¾d.-27d.

No. 1 RSS cif Basis Ports:
October 28⅛d.-28⅜d.
November 28d.-28¼d.
December 28d.-28¼d.

Godown:
October 95⅝ Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, October, November, December, 16s. 2d., cif European ports. Spot, seller, 16s. 11d. Bulk, d.w. 15s. 11d. nominal. Creamed, seller, not quoted, October, November. Normal, seller, October 13s. 10d.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on September 26 was 32.00 (32.37½) US cents per lb.

DJAKARTA

No transactions at all were reported on September 26. Sheet No. 1 was quoted at 37 rupiahs per kilo. The market closed very quiet in the absence of sellers.

	Rupiahs per kilo	
	Sept. 26	Previous
Spot No. 1 Priok ..	36.50b	37.00b
Spot No. 2 Priok ..	35.50n	36.00b
Spot No. 3 Priok ..	33.50b	34.00b
No. 1 fine pale crepe, spot	36.50b	37.00b

Tone: Very quiet.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on September 24 was 111 Ceylon cents per lb.

SINGAPORE

The Rubber Study Group's estimate of a world natural rubber surplus of 145,000 tons this year brought uneasiness to the market during morning September 26 and prices eased in thin trading. Lower sheets were neglected. The afternoon was very quiet with a slightly easier undertone. Factories showed little interest. After hours, the market was quiet.

	Malayan cents per lb. fob Malayan ports to open ports	
	Sept. 26	Prev. Close
No. 1 RSS, Oct.	98⅜- 98½	101⅛-101⅞
Nov.	98⅛- 98¼	101⅛-101⅜
No. 2 RSS, Oct.	96 - 97	99½-100
No. 3 RSS, Oct.	94½- 95½	97⅜- 98⅛
No. 4 RSS, Oct.	93½- 94½	96 - 97
No. 5 RSS, Oct.	88 - 89	90½- 91⅜
No. 1 RSS, Spot	97⅜- 98⅛	101 -101⅛
No. 3 blanket thick remilled crepe, Oct.	80 - 81	83 - 84
No. 1 fine pale crepe, Oct.	102½-103½	105½-107½
2x thin brown crepe, Oct.	80½- 81½	83½- 84½

Tone: Quiet.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 189d. per gallon.

NEW YORK

The New York rubber market ruled as under on September 26:

DEALERS' PRICES

	US cents per lb., ex-dock	
	Sept. 26	Previous
No. 1 RSS, Oct. ..	34⅜a	34⅜a
Nov. ..	34⅛a	34⅛t
No. 2 RSS, Oct. ..	34⅛a	34⅛a
Nov. ..	34a	34⅛a
No. 3 RSS, Oct. ..	34⅛a	34⅛a
Nov. ..	33⅞a	34⅛a
No. 1 RSS, Spot ..	35⅛n	35n
No. 3 amber blanket crepe, Dec. ..	28⅛n	28⅛n

FUTURES—REX CONTRACT

	Sept. 26	Prev. Close
Sept. ..	34.30b–34.75a	34.30b–35.10a
Nov. ..	34.30t	34.85t
Jan. ..	33.20b–33.25a	33.65t
March ..	32.70b–32.90a	33.10t
May ..	32.20b–32.50a	32.60b–32.80a
July ..	32.10b–32.35a	32.35b–32.60a
Sept. ..	31.65b–32.10a	32.00b–32.25a

Sales: 92. Tone: Steady at decline.

Rubber futures were easy in early dealings on September 26, declining by about half a cent per lb. on scattered selling reflecting the decline abroad but held steady at the lower levels in the afternoon. Dealings for the day were moderate. Physical rubber was quiet and prices were softer. In late dealings futures held steady.

AMSTERDAM

The Amsterdam rubber market ruled as under on September 26:

	Guilders per kilo	
No. 1 RMA	Sept. 26	Previous
September ..	2.89	2.94
October	2.88	2.93
November ..	2.87	2.92
December ..	2.86	2.91
October/December	2.87	2.92
January	2.75	2.80

Sales: Nil. Tendency: Quiet.

Companies in the News

I.C.I.

Group net income of Imperial Chemical Industries expanded to £27.6m. in the first half of 1960, compared with £20,023,000 in the corresponding period of 1959, and the interim dividend is stepped up from 9d. to 1s. 3d. per £1 unit. A total of 2s. 3d. per unit was paid for 1959.

Group sales for the period rose from £250m. to £288m. The full year's total for 1959 was £509m.

The increase in the volume of sales to customers at home is due mainly to the progressive increase in the level of industrial activity during 1959 and the early part of 1960, the directors state. Home selling prices of the company's main products in the first half of 1960 were on average 2% lower than in the first half of 1959, they add.

Throughout the first half of 1960 most plants were operating at high outputs, generally close to full capacity.

Romac

Romac Industries is paying a final dividend of 22½% making 27½% for the year to March 31 1960, against a single payment of 17½%.

The net profit increased to a record £27,432 from £21,273, after tax of £26,874, against £23,395, etc.

Mr R. D. Boyce, chairman, states that export trade expanded during the year and the cable division maintained satisfactory progress.

Australian Plastics

Over 500 delegates from the USA, New Zealand and Australia are attending the Third Australian Plastics Convention that was officially opened in Sydney last week by New South Wales Governor Sir Eric Woodward.

The Governor said that plastics manufacturers were making a great contribution to industrial development in Australia, but he wanted them to develop their export markets. Speaking of the amazing growth of plastics production during the past 14 years, he said the rate of expansion had been 20% a year. The annual value of production had risen from £A2½ million in 1946 to the present-day figure of £A50 million a year.

Epikote Resins Down Again

Shell Chemical announce that from today the price of their liquid grades of Epicote epoxy resins — 815, 828, 834 and the solid casting resin 1040 — will be reduced by 1s. per lb. on all quantities.

Mr M. H. Spieler has been appointed a director of British Enka in place of the late Mr A. V. Conrad.

Industry INTELLIGENCE

Technical Data

PVC Sintering Powder

The success of polythene sintering powders has prompted raw material manufacturers to investigate the possibility of producing sintering powders in other plastics. The standard method of producing PVC coatings on metal articles has up to now been hot dip coating using PVC paste or, in some cases, the application of the coating by cross head extrusion and subsequent fabrication. The application of the latter process is very limited, while dip coating has a basic disadvantage in that although good production rates can be achieved by carefully planned batch production, it is a rather inflexible process.

A range of PVC sintering powders for coating metal, glass and porcelain articles by the fluidized bed technique and others methods has now been introduced. These are marketed under the trade name Vinacoat and are claimed to give coatings of good appearance and gloss and of high abrasion resistance. They are available in a range of colours and the particle size is carefully controlled to give optimum sintering characteristics.

Although the use of sintering powders by the fluidized bed technique is covered by patents, arrangements have been made to grant a free licence to users of Vinacoat on application.

Further details are available on request from the manufacturers, Vinatex Limited, Devonshire Road, Carshalton, Surrey, and are included in their development report No. 5.

Machines, Materials and Equipment

Electric Combination Lock

A combination lock operating through electrical contacts instead of mechanical tumblers offers the advantage of a normal combination system, with additional features which increase its versatility.

The dial unit is essentially a switch, which completes a circuit only when the correct combination is set up. It can therefore be used in a wide range of applications other than simple locking and unlocking.

The single dial can be set up to control four different circuits by dialling four different combinations. It is therefore possible, for example, to give independent control to each drawer of a four-drawer filing cabinet from one dial.

The dial may be obtained as a detachable, plug-in unit, so that after a device has been locked, the dial is removed and unlocking is not possible until it has been replaced and set to the correct combination. With this arrangement, a single dial unit can serve as a master key to any number of devices. Should security considerations demand a new combination, this is set up very quickly on the one master dial. The lock is obtainable from Code Designs Ltd., Oldfield Lane, Greenford, Middx.

An improved Nut

The fatigue strength of nut and bolt assemblies can be improved by making a series of tapered grooves in the nut. The grooves can be formed as saw cuts, tapering from the full depth of the thread at the mating face to zero at the back face.

The effect of them is to relieve the stiffness of the first two or three threads and effect a more uniform distribution of stress over the full length of the thread in the nut.

Temperature Indicator-Controller

A new electronic temperature indicator-controller has been added to the Fielden Bikini range of instruments for temperature measurement.

Housed in a 6in. diameter panel-mounting case it has a 13in. scale

calibrated in °C. or °F. The control point is set by a pointer operated from the knob in the centre of the dial, whilst the indicating pointer is motor-driven from a servo-system.

The instrument is completely transistorized for reliability and no maintenance is required. It can be operated from 12 volts DC or mains supply.

The platinum resistance measuring bulb used with the Indicator-Controller is housed in a robust stainless steel sheath of ¼in. diameter and can be located up to 300ft. away from the instrument. The control relay has contacts rated at 10 amperes to provide both changeover and 'normally open' switching.

The makers claim a calibration accuracy of ±0.5% of the scale and a repeatability of 0.25°C. on most ranges, of which there are 73 covering −200°C. to +850°C. (−330°F. to +1,500°F.). Further information is available from Fielden Electronics Ltd., Wythenshawe, Manchester, on Spec. Sheet BIK 2/RJIP.

Blending Liquids

Pre-mixed blends of materials in liquid form often have a tendency to settle out while they are in the storage vessel and in intermediate tanks and pumps. To avoid this difficulty, a new blending machine has been designed, which brings together two or more liquids, from cylinders, and blends them, in the desired proportion, by passage through a diffuser chamber just before delivery. It is manufactured by Suba Hydraulics Ltd., 86 Lind Road, Sutton, Surrey.

This blending machine is suitable for use in many industrial processes. In one model, mains water pressure is used as the motive power to energize the cylinder containing water, and this, in turn, drives the cylinders containing other liquids.

For producing other blends, different liquids under pressure could be used, or, if desirable, air pressure. The unit is interlocked through each liquid, so that the operation ceases if the supply of any liquid fails. By adjusting the composition of liquids in the cylinders, a wide range of proportions of constituents can be provided to produce a desired blend. Electrical units can be eliminated in a blending machine handling inflammable liquids.

Publications

Robac Accelerators

Robinson Brothers Ltd., West Bromwich, have produced a new edition of their broadsheet giving an introduction to and general information on the Robac range of accelerators for natural and synthetic rubber. This broadsheet is arranged so that it can be pinned to a wall for easy reference and gives a summary of the properties and uses of each of the thirty-two accelerators available. Some general and historical information is also given on the reverse side of the sheet and the manufacturers state that enquiries are welcome and that the facilities of their well-equipped research laboratories are available to solve problems of their clients.

Synthetic Rubber Prices

Prices of synthetic rubbers appear regularly in RUBBER JOURNAL AND INTERNATIONAL PLASTICS *in the first week of each month. It will be appreciated if suppliers will give notification of any price changes or additions to their range. C/f duty paid quotations are subject to slight variation due to exchange, ocean freight and insurance fluctuations. Prices are in pence per lb., except where otherwise stated. Grades are expressed as follows:* 1001/2/6 = *grades* 1001, 1002 *and* 1006.

(e-qdp)—Ex-quay duty paid (cif UKdp)—cif UK duty paid (e-i)—Ex-installation (ddp)—Delivered duty paid (e-sUK)—Ex-store UK (ex-wUK)—Ex-warehouse UK (d)—Delivered BM—black masterbatch CBM—cold, black masterbatch CNP—cold, non-pigmented CNS—cold, non-staining COE—cold, oil extended COELC—cold, oil extended, light coloured CO/BM—cold, oil/black masterbatch CPOE—cold, pigmented, oil extended CRE—cold, rosin extended dw—Dry weight HN—high nitrile HNP—high nitrile, powder HP—hot, pigmented HS—high styrene HMW—high mol. wt. LMW—low mol. wt. MHN—medium high nitrile MLN—medium low nitrile MMW—medium molecular weight MN—medium nitrile NS—non-staining TS—total solids RTV—room temp. vulc.

SBR TYPES AND HIGH-STYRENE RUBBER

Ameripol (Goodrich Gulf) (e-qdp) (min., 70,000-lb. lots)

1000/1	Hot, Non-Oil	23.1
1002/6/7	,, ,,	23.34
1009/11	,, ,,	23.71
1012	,, ,,	23.24
1013	,, ,,	23.94
1500/1/2	Cold, Non-Oil	23.1
1703	COE, 25% Oil	*20.31
1705	,, ,, ,,	*20.07
1707/8	,, 37.5% Oil	*18.89
1710/12	,, ,, ,,	*18.66

*Under 70,000 lb., min. 600 lb.

ASRC (American Synthetic Rubber Corpn.) (cif UKdp*) (carloads lots of 30,000 lb.)

1000/1/4/6	Hot, Non-Oil	23.99
1009	,, ,,	24.61
1018	,, ,,	26.74
1019	,, ,,	26.26
1500/2	Cold, Non-Oil	23.99
1503	,, ,,	26.02
3110	,, ,,	25.78
1703	COE	20.69
1708	,,	19.27

*US/£ conversion rate $2.80

Cariflex (Shell Chemical) (e-sUK)

S-1000	Hot	22.25
S-1002	,,	23.375
S-1006	,,	22.25
S-1009/11/13	,,	24.0
S-1100	Hot/black	19.75
S-1500/2/9	Cold	22.25
S-1600/2	Cold/black	19.625
S-1605	,, ,,	19.375
S-1703	COE	20.25
S-1707	,,	18.0
S-1709/12	,,	17.75
S-1803	COBM	17.875

FR-S (Firestone) (esUKdp*)

1000/1/4/6/7	Hot	22.25
1500/2	Cold	22.25
146	,,	22.25
1710/12	OE	17.75
184	,,	17.75
178	,,	18.0
1009 cif UK	Specialty	24.75
1010	,, ,,	26.0
1012	,, ,,	24.25
1013	,, ,,	25.0
1014	,, ,,	28.125
1015	,, ,,	28.75
141	,, ,,	28.625
181	,, ,,	24.125
182	,, ,,	25.0
158	,, ,,	29.5

*US/£ conversion rate $2.80

Int. Synthetic Rubber (d)

Intol 1500/2	22.5
Intol 1509	22.5
Intol 1570	22.5
Intol 1006	22.5
Intol 1710	18.0
Intol 1712	18.0
Intol 1778	18.25

Naugapol (Naugatuck Chemical) (e-sUK)

1016	28.0
1018	28.5
1019	28.0
1022	30.75
1023	32.75
1503	27.75
1504	34.0
6101	26.25
6102	27.75
K-45	30.5
K-50	31.25
KO-50	29.0

ANIC (cif UK dp)

1500	22.25
1502	22.25
1708	18.00
1712	17.75

Philprene (Phillips) (e-qdp*)

1000/1/6	Hot, Non-Pig	23.28
1009	,, ,,	24.69
1010	,, ,,	25.86
1018	,, ,,	26.80
1019	,, ,,	26.33
1100	HP	19.65
1104	,,	19.28
1500/2	CNP	23.28
1503	,,	26.1
1601	CP	19.56
1605	,,	19.28
1703	COE	20.23
1706	,,	19.94
1708	,,	18.82
1712	,,	18.58
1803	CPOE	17.78
1805	,,	15.99

*US/£ conversion rate $2.81½

Plioflex (Goodyear) (ex-wUK)

1006	HNP	22.25
1500/2/7/8	CNP	22.25
1006	S	22.75
1703	COE	19.25
1710/12	,,	17.75
1773	COELC	19.25
1778	,,	18.0
B—6		27.5
B—5		28.0

Polysar (Polymer UK) (e-sUK)

S Hot		22.25
S-630 Hot		22.25
Kryflex 200 Cold		23.5
Krylene		22.25
Krylene NS		22.25
Krylene 602 Cold		22.25
Krynol 651 COE		17.75
Krynol 652	,,	18.0
S-X 371 Process Aid		24.0

Synpol (Texas-US Chemical) (e-qdp)

1000/1	Hot	22.25
1002	,,	22.47
1006/7	,,	22.25
1009	,,	22.81
1012	,,	22.38
1013/61	,,	22.25
X274	,,	23.45
8000	,,	22.25
1500/02/51	Cold	22.25
1703	COE	19.25
1707/8	,,	18.0
1711	,,	17.88
1712	,,	17.75
8200	,,	18.0
8201	,,	16.6
8202	,,	16.38
8152	CBM	18.6
8151	COBM	18.2
8253	,,	15.84
8254	,,	15.45
8255	,,	14.8
8267	,,	16.4

(Masterbatch prices US cents per lb. fas Gulf ports)

SBR LATICES

Copo (Copolymer) (cif UKdp) (10-ton lots)

2101	(dw)	46.3
X-765	,,	40.8
X-800	,,	37.2
2102/5	,,	38.0

Pliolite Rubber (Goodyear) (d)

2000	40

Latex (dw)

2001/4/5/8	40
5350	40

Pliolite Resin (Goodyear) (d)

101A	(dw)	44
150	,,	50
151	,,	35
160	,,	50
170	,,	50

Hycar (B. F. Goodrich) (ddp)

2507 (HS) dw	48

Polysar (Polymer UK) (e-sUK)

Latex, type IV	32.5 TS
Latex, type 722	31.75 TS
(Non-returnable 45-gallon drums) (e-i)	
Latex, type 722 (bulk quantities)	28.75 TS

Int. Synthetic Rubber (ex-wks)

Intol Latex M23B/R23/F28	22.25
Intol Latex 62A	27.0

Dylex (Koppers Int. CA) (fas)

K-42A/52/31/900	31.6

ACRYLONITRILE TYPES

Butaprene N (Firestone) (cif UKdp)

NL	52.5
NAA	56.25
NF	51.5
NXM	60.18

Chemigum (e-s)

N—1	75
N—3A	52
N—5	52
N—6G/7/8/600X	45

Hycar (British Geon) (UKd) (500-lb. lots and over)

1001	High Nitrile Hot	52
1041	,, ,, Cold	52
1002	MHN Hot	45
1042	,, Cold	45

Hycar (B. F. Goodrich) (ddp) (500-lb. lots and over)

1411	HNP	66
1432	MHN (crumb)	64
1072	,, (carboxyl)	66
1312	,, (liquid)	55
1043	MLN	51
1014	Low Nitrile	61

I.C.I. (min., 5-cwt. lots) (UKd)

Butakon A-4051 HN Cold	52
Butakon A-3051 MN Cold	45
Butakon A-3002 ,, ,,	45

Paracril (US Rubber) (dwe-sUK)

18-80	Low Nitrile	61
AJ	,, ,,	50
B	MLN	51
BJ	,,	51
BLT	,, Cold	51
BJLT	,, ,,	51
C	MHN	59
CLT	,, Cold	59
CV	,, (crumb)	63
D	High Nitrile	67
ALT		51
OZO		47

Polysar (Polymer UK) (d)

Krynac 800 MN	45
Krynac 802 LN	45
Krynac 803 MN (low Mooney)	45
Krynac 801 HN	52
Krynac 804 (MN-cross linked)	45

ACRYLONITRILE LATICES

Buta prene N (Firestone) (cif UKdp)

N-300 (dw)	53
N-400 ,,	60.5

Chemigum Latex (Goodyear) (d)

200	(dw)	65
235/6	CHS ,,	60
245	B ,,	52
245/6/7/8	CHS ,,	52

Hycar (B.F. Goodrich) (ddp) (dry weight, drum lots)

1551 High Nitrile	66
1552 MHN	57

Hycar (British Geon) (UKd) (dry weight, 3 drums and over)

1561	High Nitrile	60
1571	,, ,, (carboxyl)	60
1562	MHN	52
1577	,, (modified)	52

ACRYLIC TYPES

Hycar (B. F. Goodrich) (ddp)

4021 Slab, 500 lb. and over	144
4501 Latex, dry weight	96

BUTYL TYPES

Esso (e-sUK)

Regular 035/150/215	21.75
Regular 217/8	21.75
Regular 325	21.75
Non-staining 165	22.75
Non-staining 268	22.75
Non-staining 365	22.75

Vistanex (Polyisobutylene) (e-qdp)

MS	LMW	54
MH	,,	54
L-80	MMW	54
L-100	,,	54
L-120	,,	54
L-140	,,	54

Polysar (Polymer UK) (e-sUK)

Butyl 100/200/300		21.75
Butyl 301/400	NS	21.75
Butyl 101	NS	26.25
Butyl 402	NS	22.5

Hycar (B. F. Goodrich) (ddp) (500 lb. and over)

2202 Brominated	68

NEOPRENES

		(ddp)
W and WHV	(dwdel)	42.62
WRT	,,	48.37
WX/GN/GNA	,,	44.62
GRT and S	,,	45.62
AC	,,	57.125
KNR	,,	75.62
AC 'M' and 'S'	,,	57.125
CG/AD	,,	57.125

Latices—Dry (per lb. del, min., 50 lb.)

571	49.75
842A	49.75
572	51.25
601A	51.87
650	54.125
735	51.25
736	51.25
950	58.25
60	51.87
750	51.25
635	53.62

SILICONE RUBBERS

Midland Silicones (500-lb. lots del)

Stocks	16s. 6d. to 35s.
Pastes	26s. to 35s.
Gums and base stock	36s. to 42s.
Cold-curing silicone rubber	20s. and 23d. 6d.

I.C.I. Silicones

Gums (40-lb. lots del)	39s. 6d.-47s.
Stocks (250-lb. lots del)	22s.-35s.
Pastes (1000-lb. lots del)	27s.6d.-35s.9d.
Silcoset (RTV) (250-lb. lots del)	21s. to 24s.

REINFORCING RESINS AND RUBBERS

I.C.I. (min., 2-ton lots) (UKd)

Butakon S-8551	36.5
Butakon S-7001	33.5

Hycar (B.F. Goodrich) (ddp)

2007 (powder)	42.5

Pliolite (Goodyear) (d)

S—6B	36.5

Polysar (Polymer UK) (e-sUK)

SS-250 HS (bale)	27.25
SS-250 ,, (flake)	27.5
Kryflex 252 HS	25.5
Kryflex 202 (HMW Cold polymerized)	25.75

Cariflex (Shell) (e-sUK)

SP-103	28.0

Cyclite (Durham Raw Materials) 42

HYPALON (ddp)

20	48
30	60.25
40	50.75

PI LONDON SECTION

Two of last year's most successful meetings of the Plastics Institute's London section were the symposium on preplasticizing in injection moulding and the 'overseas' lecture given by Dr Akutin of the Moscow Plastics Institute. The form of these will be followed in the 1960/61 session, which will include a symposium on extrusion, and a lecture on the French plastics industry.

The annual luncheon will be held at the Criterion in Piccadilly; the speaker will be Dr S. G. Burgess, chief scientific officer of the L.C.C. The annual dinner dance will be held on January 12.

BP Department Moves

Baker Perkins Ltd. have moved the department dealing with the sales design and development of all plastics machinery to Granbull Tool Co. This follows the take over of Granbull earlier this year. The address of Granbull is 39 High Street, Kingston-on-Thames, Surrey. The managing director of Granbull is F. G. Bull; sales manager is B. S. C. Quint; engineering manager is N. Harwood, and the technical sales engineer is R. W. Doone.

Matters referring to mixers, sifters, pneumatic handling and chemical processing is still being handled by the chemical machinery dept. at Peterborough.

Russians at Sarnia

A delegation of eight Russian engineers visited the Polymer Corp.'s plant at Sarnia, Ontario, last month, for a visit to the Canadian synthetic rubber industry. Their visit was one of a series of technical exchange missions which have been arranged in various fields during the past few years.

Recently a party of Polymer officials made a similar tour of Russian synthetic rubber installations.

BP Solvents Plant

British Petroleum Company's first installation in the UK for the production of a range of special solvents from petroleum spirits has been commissioned at Kent Refinery. The plant has a total annual capacity of 30,000 tons.

The Board of Trade have appointed M. J. Morris, Q.C., and Duncan McKellar, O.B.E., to investigate the affairs of Siginting (Negri Sembilan) Rubber Estate Ltd. and Ratanui Rubber Ltd.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M.

KOLLABOND (B795,661) Synthetic resins for use in manufacture, and chemical products for use as hardening or cross-linking agents in the production of synthetic resins. Beck, Koller and Co. (England) Ltd., Beckacite House, Edwards Lane, Speke, Liverpool 24. (Class 1; September 6 1960).

POLYROLLA (804,020) and-rollers made of foamed materials, sheepskin and of mohair, for use in applying paint. Polycell Products Ltd., 5 Carker's Lane, Highgate Road, London, N.W.5. (Class 16; September 6 1960).

PLASDELUX (804,323) Handles (not principally of metal) for brushes, mops and for the like cleaning implements. Betterwear Products Ltd., North Street, Romford, Essex. (Class 20; September 6 1960).

DUCTFAS (797,572) Adhesives for securing insulation materials to metal surfaces. Benjamin Foster Co., 4625-4637 West Girard Avenue, Philadelphia, 31. Address for service is c/o Sanderson and Co., 11-13 Bream's Buildings, London, E.C.4. (Class 1; September 20 1960).

CUBE (796,545) Blood collection units made of plastics, all for medical and surgical use. Travenol Laboratories Inc. 6301 Lincoln Avenue, Morton Grove, Illinois, USA. Address for service is c/o Eric Potter and Clarkson, 14 Oxford Street, Nottingham. (Class 10; September 20 1960).

TOPAT (802,689) Protective caps made of plastics for fitting over the threaded parts of bolts and the like. Dowty Seals Ltd., Ashchurch, Tewkesbury, County of Gloucester. (Class 17; September 20 1960).

FANTASTEX (804,785) Natural rubber latex in liquid form. David Marsh (Manchester) Ltd., Irk Rubber Works, Queen's Road, Collyhurst, Manchester, 9. (Class 17; September 20 1960).

SOCABUTEX (792,981) Plastics in the form of sheets, blocks, rods and tubes, being for use in manufacture and included in Class 17; and synthetic rubber. Société du Caoutchouc Butyl (Socabu), 8 Rue Belleni, Paris. Address for service is c/o Lloyd, Wise, Bouly and Haig, 10 New Court, Lincoln's Inn, London, W.C.2. (Class 17; September 20 1960).

POROSAN (788,602) Rigid, flexible or extendable rods and tubes, and shaped end pieces therefor, all being furnishing fittings and made wholly or principally of metal. Porosan Plastics Ltd., 30 South Street, Chichester, Sussex. (Class 20; September 20 1960).

NEW COMPANIES

Plastic Coating Research Company Ltd. (667,036).—August 8. Capital: £1,000 in £1 shares. To carry on the business of manufacturing, research, diagnostic, analytical, consulting and development chemists, manufacturers of and dealers in plastics and plastic materials, etc. The directors are: James H. Blakely and Audrey J. Blakely, both of 72 Thames Street, Sunbury-on-Thames (directors of Plastic Dipping Co. Ltd.) Regd. office: Liverpool House, 15/17 Eldon Street, E.C.2.

Henderson and Co. (General Produce) Ltd. (667,513).—August 11. Capital: £10,000 in £1 shares. To carry on the business of agents for the buying and selling of, importers and exporters of and dealers in, rubber, cocoa, spices, tea, coconut oil, etc. The directors are: Margaret M. Hellwig, 'Horwood,' High Street, Newport, Essex; Anthony C. Buckingham. Regd. office: 107/111 Fleet Street, E.C.4.

Shield Plastics Ltd. (667,590).—August 12. Capital: £10,000 in £1 shares. The directors are: Arthur S. Tottman, 74 Hereson Road, Ramsgate; Peter R. Green, 3 Sandwood Road, Ramsgate; Thomas J. Ginn, 'General Wolfe,' Wilsons Road, Ramsgate. Regd. office: 39/40 St. Margarets Street, Canterbury.

Cacogin Ltd. (667,475).—August 11. Capital: £100 in £1 shares. To carry on the business of manufacturers and processors of and dealers in plastics, modelling and moulding materials, etc. Secretary: Stanley H. Lucas. Regd. office: 6 Surrey Street, W.C.2.

Austin Young Ltd. (668,726).—August 29. Capital: £2,000 in £1 shares. To carry on the business of manufacturing, machining, fabricating and processing of plastic materials and metals, etc. The directors are: Geoffrey Austin Young, Leeston, Over Butterrow, Stroud; Derek T. Austin Young, Brayston, Burliegh, Nr. Stroud. Regd. office: 1/3 Whitfield Street, Gloucester.

Cromwell Claddings Ltd. (668,605).—August 26. Capital: £1,000 in £1 shares. To carry on the business of agents for the sale, distribution and fixing of fibre glass sheeting, etc. The directors are: Harold Bolton, Atlas Chambers, King Street, Leeds, 1; Robert W. Walker, 84 Norwood Road, S.E.24. Regd. office: Atlas Chambers, King Street, Leeds, 1.

Sharkie and Huntbatch Ltd. (668,782).—August 29. Capital: £15,000 in £1 shares. To acquire the business of the late Joseph L. Huntbatch carried on at 32a Upper Brook Street, Manchester, 13, as 'Sharkie and Huntbatch' and to carry on the business of manufacturers of and dealers in manufactured guides, switches and other articles made from bakelite, micanite, etc. The directors are: George A. Spencer, 29 Broadway, Bramhall, Ches.; George S. Marr, 469 Walshaw Road, Bury; James A. Young, Harry Cunliffe and Joseph A. Evans, all directors of British Cotton and Wool Dyers Association, Ltd., etc. Regd. office: Cumberland House, Lissadel Street, Pendleton, Salford, 6.

Start of the journey for 2,000 gal. of I.C.I. iso-octanol by Portolite flexible container. This is the first time the company's heavy organic chemicals division has used this method of transport (*RJIP*, September 24, 473). The interior lining of the tank is of rayon-reinforced butyl rubber

Latest Wills

Major Bertram Claude Barton, O.B.E., of Castle Mead, Nea Road, Highcliffe, Hants., retired engineer, formerly for over 20 years factory manager at Preston with the British Tyre and Rubber Co. Ltd., who died on May 30th, aged 76, left £46,522 gross, £46,184 net value.

Mr Frederick Foxley, of 75 York Avenue, Finchfield, Wolverhampton, Staffs., formerly of Hollyfield Road, Sutton Coldfield, manager of the Dealer-Relations department of the Goodyear Tyre and Rubber Company (Great Britain) Ltd., Wolverhampton, died on May 30, leaving £9,679 gross, £9,560 net value.

Mr Harold Rupert Turner, of 5 Rue de Tilett, Paris, former chairman and managing director of Ferodo Ltd., and director of Turner and Newall Ltd., who died on October 26, left estate in England valued at £1,526 15s. 9d.

Mr. Robert Surridge, of 35 Marine Avenue, Hove, Sussex, founder of Surridge's Patents Ltd. and Holdtite Stick-on-Soles Ltd., who died on April 15, aged 87, left £20,863 8s. 2d., £16,415 3s. 5d. net value.

Increases of Capital

Formica Ltd. (139,751), De La Rue House, 84/86 Regent Street, W.1.—Increased on February 23, 1960, by £400,000, in £1 ordinary shares, beyond the registered capital of £3,000,000.

Wellard (Tyres) Ltd. (530,192), 21 Richmond Road, Romford, Essex.—Increased on February 22, 1960, by £8,000, in £1 shares, beyond the registered capital of £2,000.

W. S. J. and E. Rose Ltd. (613,685).—Manufacturers of and dealers in rubber tyres, etc., 18a Sherborne Road, Newton Abbot. Increased on January 28, 1960 by £4,000, in £1 ordinary shares, beyond the registered capital of £1,000.

Consolidated Salak Rubber Estates Ltd. (513,372), 16 Philpot Lane, E.C.3.—Increased on February 10, 1960 by £500,000, in 2s. shares, beyond the registered capital of £500,000.

Changes of Name

Simonside Productions Ltd. (466,686). Manufacturers of rubber, textiles, leather, building, engineering and chemical materials, etc., Bede Trading Estate, Jarrow-on-Tyne.—Name changed to Simonside Ltd., on March 31, 1960.

Sussex Laminations Ltd. (642,315). Plastics, etc., 61 Portland Place, W.1.—Name changed to Sussex Laminations (Sales) Ltd., on March 30, 1960.

R·I·P·

CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word, Minimum 10/-. Box 2/-.

A VACANCY occurs for a young rubber technologist of L.I.R.I. standard. Experience in footwear compounds would be an advantage. This is an opening with good prospects.—Applications, which will be treated with confidence, should be addressed to:—Sam Kay Rubber Co. Ltd., Hope Mill, Portwood Place, Stockport. (542)

LATEX chemist/technologist required. Good prospects for right man. Pension scheme in operation.—Write stating age, experience and salary required to Rubber Latex Ltd., Harling Road, Wythenshawe, Manchester, 22. (556)

APPOINTMENTS VACANT

(continued)

MIDLAND Silicones Ltd. require an assistant to the Manager of the Rubber Products Sales Department in London. Candidates should be aged 24-30 with a B.Sc or an appropriate technical qualification. Experience in industry is essential with preferably a sales or commercial background. Knowledge of one or more foreign languages an advantage. The company continues to expand. This post offers interesting work connected with products having many industrial applications both at home and abroad. A non-contributory pension and a housing scheme are in operation.—Apply to Staff Officer, Albright & Wilson Ltd., 1 Knightsbridge Green, London, S.W.1. (Ref. No. 37). (558)

EXECUTIVE DIRECTOR—

FRICTIONS PRODUCTION

for a medium-sized public Company situated in North Cheshire and manufacturing brake-linings, industrial beltings and similar products. Salary will not be less than £1,750 p.a. plus considerable bonus based on sales. This will give total earnings of above £2,000 with good prospects of appreciable increases.

The Executive Director will have complete control of all aspects of the management of his Department, including lay-out, methods, production planning and control, quality control, the purchase of equipment and raw materials, selection, training and leadership of his staff. After a short time he will also be invited to become a member of the Executive Board of the Company.

Desired experience includes several years as a Superintendent or Manager of a Production Department, and practical experience of the use of press tools, forming and metal cutting machinery—it would be of advantage if this experience had been obtained in a small to medium sized business in the plastics industry.

Please write briefly, in first instance, quoting Reference No. 856, to:

AA LTD

ASHLEY ASSOCIATES LIMITED
PETER HOUSE · MANCHESTER 1
Retained to advise on this appointment
THE STRICTEST CONFIDENCE WILL BE OBSERVED AND NO DETAILS OF CANDIDATES WILL BE PASSED TO CLIENTS WITHOUT CANDIDATES' PERMISSION

(553)

APPOINTMENTS VACANT

(continued)

MILL Room Manager required by expanding Midlands company specialising in the production of engineering components in a wide range of natural and synthetic rubbers. Must be experienced in all aspects of mill room activity, particularly extruding, and capable of taking complete control. Splendid opportunity in a progressive organisation; good salary with pension and life assurance scheme.—Applications, which will be treated in confidence, should give full details of experience and be addressed to Box 563. (563)

RUBBER company moving in the near future to East Anglia require an assistant chemist/technologist. Applicants should be 20-28 years of age, educated to L.I.R.I. standard, and be capable of controlling laboratory, production and development work in all classes of elastomers, natural and synthetic. Reply in confidence, giving details of experience and salary required.—Box 555. (555)

MISCELLANEOUS

6d. a word, Minimum 12/6 Box 2/-

SILICONE rubber moulding. Capacity available for prototype and repetition work.—Esco (Rubber) Ltd., 34/36 Somerford Grove, London, N.16. (170)

AGENCIES and REPRESENTATIVES

6d. a word, Minimum 12/6 Box 2/-

BTR

require

SALES REPRESENTATIVES

to market

MOULDINGS AND GENERAL MECHANICAL RUBBER PRODUCTS

in (a) The North-East (Ref. MGMa)
(b) The East Midlands (Ref. MGMb).

Candidates must have an
ENGINEERING BACKGROUND
preferably with knowledge of such products,
aged 30-45

Good salary, prospects, pension, car, expenses

Full career details to Group Personnel Officer,
B.T.R. INDUSTRIES LIMITED
Herga House, Vincent Square,
London, S.W.1. (550)

BTR

require a

SALES REPRESENTATIVE

with qualifications in engineering
and sound knowledge of
POWER TRANSMISSION
to market
INDUSTRIAL V BELTS and
FRICTION SURFACE
TRANSMISSION BELTING
in Southern Counties.

Candidates aged 27 to 45 with similar experience are preferred. Good salary, prospects, pension, car, expenses.

Full career details to Mr. P. K. Brewin (Ref.VBRS),
B.T.R. INDUSTRIES LIMITED
Herga House, Vincent Square, London, S.W.1. (552)

AGENCIES and REPRESENTATIVES

(continued)

THE DISTILLERS COMPANY LIMITED

SALES DEVELOPMENT REPRESENTATIVE

British Resin Products Limited, a member of the Plastics Group of The Distillers Company Limited, wish to appoint a further Sales Development Representative to be based on London. In close collaboration with customers and the Group's Technical Service staff, he will develop the fabrication and end uses of thermoplastic and thermosetting plastics raw materials. Considerable travel at home and some abroad will be involved.

A practical knowledge of plastics moulding and extrusion processes and machinery is essential and an appreciation of technical and design problems in such fields as light engineering, packaging or materials handling would be an advantage.

Candidates, age between 27—40, should hold at least an H.N.C. or equivalent qualification.

Write:

STAFF MANAGER
THE DISTILLERS COMPANY LIMITED
21/22 BOLTON STREET
LONDON, W.1

Quote Ref.: 108/60 R.J.

(549)

Donald Leaver Limited

1 LONDON ROAD, STAINES, MIDDX. Phone STAINES 55271-2

FOR **SECONDHAND PLANT AND MACHINERY** (559)

MACHINERY FOR SALE

6d. a word, Minimum 12/6 Box 2/-

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

NO. 11 Banbury with 250 h.p. drive. K.4 Intermix with 110 h.p. drive. 8¼-in. strainer extruder with 40 h.p. drive. 4in. Camelback extruder. 9in. x 4in. 2-speed laboratory mill.—Reed Brothers (Engineering) Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Tel. Woolwich 7611 (6 lines). (557)

STEAM-HEATED rubber vulcanizing oven, 4ft. dia. x 6ft. long, in first-class condition.—Box 358. (358)

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6d. a word, Minimum 12/6. Box 2/-.

BLACKFRIARS 24 x 12 rotary cutter, two wanted, or similiar grinder.—Moore, 6 Bristol Road, Keynsham. Phone 2828. (562)

DIESEL generating plants wanted!!! Price and particulars to Speed Electrics, Church Street, Basford, Nottingham. Tel. 75716. (533)

MELLOR Equipment Ltd., Springfield Lane, Salford, 3, buy used machinery of Francis Shaw and Joseph Robinson manufacture.—Telephone: Manchester, Blackfriars 1866. (441)

WANTED. Two or more 32in. x 27in. double daylight presses and pumping equipment.—W. A. Thatcher Ltd., Pontygwaith, Rhondda, Glam. (539)

ARTICLES WANTED

6d. a word, Minimum 12/6. Box 2/-.

THERMOPLASTIC scrap. We always buy large and small quantities and pay prompt cash.—Send offers to J. W. Nash and Co., Ltd., 27 Beethoven Street, London, W.10. Ladbroke 4655. (531)

PVC *Sheeting scrap all types colour sorted and mixed regular quantities available*

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Station Works, 75c Upper Richmond Road, Putney, S.W.15
VANDYKE 6925 (546)

TRADE SERVICES

6d. a word, Minimum 12/6 Box 2/-

SCISSORS, up to 7in. ground and set by London cutlers established over 100 years; 48 hours postal service, 1/6 per pair.—J. A. Fowler, 18/22 Bell Street, Edgware Road, London, N.W.1. PAD 1491. (74R)

PATENTS

6d. a word, Minimum £1. Box 2/-.

THE proprietor of British Patent No. 695049, entitled 'Improvements in Snow and Ice Tires' offers same for licence or otherwise to ensure practical working in Great Britain.—Inquiries to Singer, Stern & Carlberg, 140 So. Dearborn Street, Chicago 3, Illinois, USA. (551)

APPOINTMENTS WANTED

6d. a word, Minimum 10/-. Box 2/-.

RUBBER technologist seeks appointment. Home or overseas. —Box 561. (561)

TECHNICAL executive (48), A.M.C.T., F.I.R.I., F.P.I., with extensive laboratory, development and industrial experience in the rubber and plastic industry seeks senior post.—Write Box 554. (554)

YOUNG qualified executive seeks progressive appointment. Widely experienced in laboratory control, works management and technical sales. Specialised in footwear compounds, including direct-vulcanising and adhesives.—Box 560. (560)

EXPORT ISSUE

OCTOBER 15th

SPECIAL NOTICE to Advertisers who use our Classified Columns from time to time, and who may wish to place **an announcement concerning their organization** in the **Classified Section** of this important issue, please note that **copy must be received by 10.45 a.m. October 10th 1960.**

ALSO COPY FOR OUR OCTOBER 8th ISSUE MUST BE RECEIVED BY 10.45 a.m. OCTOBER 4th

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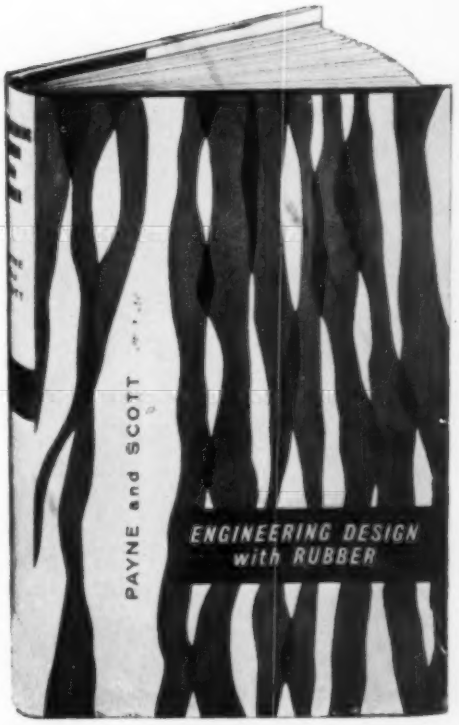

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